

DRAINAGE STUDY FOR:

Parcel 1 of PM 8957
38455 E. Benton Road
Riverside County, Ca 92544
Commercial Agricultural Facility

Riverside County, CA

PTS NO. TBD

September 19, 2025

Prepared for:

Sun Grown Farms Inc
38455 E. Benton Road
County of Riverside, CA 92544

Prepared by:

DSB Engineering
43460 Ridge Park Drive, Suite 200T
Temecula, California 92590
(951) 440-5703

TABLE OF CONTENTS

I. PROJECT DESCRIPTION.....	3
II. EXISTING SITE CONDITION DRAINAGE.....	4
III. DEVELOPED SITE CONDITION DRAINAGE	5
IV. HYDROLOGIC METHODOLOGY	6
V. HYDRAULIC METHODOLOGY	7
VII. DISCUSSION AND RESULT	8
APPENDIX A: HYDROLOGIC CALCULATIONS	9
○ 100 Year Hydrology Analysis - Existing Area A-1 to A-3	9
○ 100 Year Hydrology Analysis - Proposed Area A-1 to A-4	9
○ 100 Year Unit Hydrograph Analysis – Existing Condition	9
○ 100 Year Unit Hydrograph Analysis – Proposed Condition	9
○ Preliminary Basin Routing Analysis.....	9
○ Basin A – Depth-Storage Table	9
APPENDIX B: HYDRAULIC CALCULATIONS.....	10
○ Storm Drain Line A Hydraulics	10
○ Curb Inlet “A” in Sag Hydraulics	10
○ Riprap Standard Detail Design – Std No. 314	10
○ Trash Capture Detail – Std No. 313	10
○ Trash Capture Bypass Check.....	10
APPENDIX C: REFERENCE	11
○ Riverside County Excerpt: Plate D-5.6 Impervious Cover for Developed Areas.....	11
○ NOAA Atlas 14 Point Precipitation Frequency Estimates	11
○ Riverside County Excerpt: Plate D-4.6 Slope of Intensity-Duration Curve	11
○ Riverside County Excerpt: Plate D-5.5 Runoff Index for Pervious Areas.....	11
○ Riverside County Excerpt: Plate D-3 Time of Concentration Nomograph.....	11
○ Riverside County Excerpt: Plate D-4.7 Intensity-Duration Curves Sheet	11
○ Riverside County Excerpt: Plate D-5.7 Runoff Coefficient Data	11
○ FEMA Flood Hazard Map	11
○ NRCS Soil Survey	11
MAP POCKET: EXISTING CONDITIONS EXHIBITS	12
○ Existing Condition Hydrology Exhibit.....	12
MAP POCKET: PROPOSED CONDITIONS EXHIBITS	13
○ Proposed Condition Hydrology Exhibit.....	13

I. PROJECT DESCRIPTION

The project is new development that will construct a commercial agricultural facility for the cultivation of cannabis. The project will include the creation of a graded pad, gravel parking stalls and 3 buildings. The project is located in the Riverside County, just passed the major intersection of E. Benton Road and Crossover Road, in the unincorporated Sage Community (census-designated place). The parcel measures approximately 9.9 Ac, but will be subdivided to only include 5 acres to the agricultural facility. The project is designated as Parcel 1 of Parcel Map 8957 (APN 915-330-040) , referred thereafter as the Commercial Agricultural Facility.

The enclosed hydrology report analyzes the 100-year storm event hydrology for the existing and proposed condition. Proposed condition peak flows for the 100-year design storm will be compared to existing condition. Recommendations on detention basin and conveyance system sizing will be provided. Please refer to the map book pockets, Proposed Condition Hydrology Map for an overview of the project drainage pattern.

II. EXISTING SITE CONDITION DRAINAGE

Referring to Existing Condition Hydrology Map in the map book section of this report, the drainage pattern of the existing site flows south at an average slope of 7% . The existing site is vacant and bound by residential properties on the north and south, vacant land on the east and E. Benton Road on the westerly boundary. The site has an existing single-family home on the southwest corner of the property, which will become its own parcel, separate from the project site.

Review of the NRCS Soil Survey Report shows the project is mostly under hydrologic soil D, which is characterized as having a high runoff potential with low infiltration capacity. The project area has little to no ground cover with brush along the existing flow line the traverses the existing study area. The land cover is classified as Grass per the Riverside County Hydrology Manual.

III. DEVELOPED SITE CONDITION DRAINAGE

The project will construct a commercial agricultural facility for the cultivation of cannabis, on 5 acres of land. The project includes gravel parking stalls, ADA stalls and 3 commercial buildings on a graded pad. The drainage pattern follows the existing condition, with water continuing the existing drainage course south. Onsite drainage first drains to a proposed bioretention basin for first flush treatment, then drains to a detention basin for mitigating the 10-year design storm.

Since the project is designated as a commercial site, the hydrology analysis uses Plate D-5.6, with a land use is described as Commercial, which is described with an average impervious fraction of 90%. Furthermore, given the pervious area runoff index for the developed site is described as Urban Cover, which has a value of 75 for soil group type D for AMC II. For undisturbed areas within the project, an undeveloped land-use designation is used, with poor annual grass used to describe the cover quality. A runoff index of 89 is used for the undeveloped areas per Plate D-5.6. Please refer to Appendix E Proposed Condition Hydrology Map, where the overall project drainage pattern is delineated.

IV. HYDROLOGIC METHODOLOGY

The overall drainage basin of study covers 4.9 acres. A survey was done for the project area, where contours were generated and used for the design of the proposed project. The Riverside County Hydrology Manual's Rational Method Procedure was the basis for the proposed condition 100-Year hydrologic analysis. The rational method input parameters used included an AMC of 3 and Land Use, which was modeled as Commercial and Undeveloped (Poor Cover) for undeveloped/grass areas. Physical characteristics such as the flow path and elevation difference were also used in calculating the time of concentration.

Due to the increase in impervious area, the project expects an increase in peak flow, from existing conditions. For that reason, preliminary basin routing calculations is performed using the Unit Hydrograph Analysis. The basin sizing calculation uses the 10-year design storm for the 24-hour storm event. For preliminary design, the difference in volume between the existing and proposed condition hydrograph is used to determine the detention basin sizing. Final basin sizing calculations will be performed during final engineering, where the outlet structure will be routed through the bioretention basin using the modified puls method. Please refer to Appendix A for the full hydrology analysis.

V. HYDRAULIC METHODOLOGY

The project will construct multiple drainage facilities to convey the drainage across the improvements and out towards its natural drainage course. For this reason, a hydraulic analysis is required, which will ensure that the proposed drainage structures are adequately sized to convey the onsite flow. The proposed facilities include storm pipes, a catch basin inlet and a riprap energy dissipator.

The proposed storm drain pipes and catch basins are sized using Hydraulic Toolbox 5.4.0.0 by the Federal Highway Administration. The proposed riprap energy dissipator uses the Riverside County Transportation Department Standard Detail No. 314, based on the design velocity of the proposed pipes. The proposed outlet structure for the bioretention basin is sized based on the basin routing analysis for hydromodification and modified puls method. For the purpose of preliminary design, the outlet structure is sized, at a minimum, to accommodate hydromodification and bypassing the peak 100-year flow rate. During Final engineering, the outlet structure will be fully designed to incorporate additional orifices as necessary.

VII. DISCUSSION AND RESULT

Table 1: Rational Method Analysis Summary Table

Condition	Drainage Area ID	Area (ac)	Q100 (cfs)
Existing Condition	A-1 to A-3	4.90	22.15
Proposed Condition	A-1 to A-4	4.90	23.70

Table 2: Preliminary Basin Sizing Analysis Summary Table

Storm Event	Existing Condition		Proposed Condition		Comparison		
	Qpeak (Cfs)	Volume (Acft)	Qpeak (Cfs)	Volume (Acft)	Delta Flow (cfs)	Delta Volume (acft)	Delta Volume (cf)
10 Year, 1 Hr	15.103	0.4054	26.935	0.4186	11.8	0.0132	575
10 Year, 3 Hr	7.225	0.5416	12.112	0.5811	4.89	0.0395	1,721
10 Year, 6 Hr	5.307	0.474	8.938	0.5537	3.63	0.0797	3,472
10 Year, 24 Hr	2.319	0.8634	3.882	1.09	1.56	0.2253	9,814

Upon review of the hydrologic calculations and above summary table, the 100-year flow shows an increase peak flow rates in the proposed condition. As a result, the proposed bioretention basin is sized to mitigated peak flows to existing condition, which contains a volume of 29,176 cuft. The basin also shows compliance with the hydromodification criteria, as shown in the projects Preliminary Water Quality Management Plan. Lastly, the storm drain facilities are sufficient sized to convey drainage across the development and to the natural drainage path, with no impact on the proposed site Please refer to the enclosed hydrology report with supporting conclusions hereon.

APPENDIX A: HYDROLOGIC CALCULATIONS

Rational Method Hydrology Analysis

- 100 Year Hydrology Analysis - Existing Area A-1 to A-3
- 100 Year Hydrology Analysis - Proposed Area A-1 to A-4
- 100 Year Unit Hydrograph Analysis – Existing Condition
- 100 Year Unit Hydrograph Analysis – Proposed Condition
- Preliminary Basin Routing Analysis
- Basin **DET-1** – Depth-Storage Table

Riverside County Rational Method Analysis

100 Year Existing Condition Rational Method Hydrology Analysis																			
											AMC		3	2 yr 1 Hr	0.613	100-yr 1 hr:	1.88	Slope of IDC:	0.57
Major Drainage Area A																			
Node ID	Flow Description	Sub Area ID	Area (Acres)	Land Use	Impervious %	Flow Length (ft)	Upstream Elevation (ft)	Dwnstream Elevation (ft)	Slope (%)	Tc=Ti+Tt	Soil Distribution	Cover Type	Weighted RI Index	Runoff Coefficient C	I (in/hr)	Q=CIA			
1-2	Initial Area	A-1	0.14	0% Undeveloped - Poor Cover	0	222	2324.00	2318.50	2.5	9.64	0% - Soil A 0% - Soil B 0% - Soil C 100% - Soil D	Grass, Poor Cover	AMC1: 76 AMC2: 89 AMC3: 96	0.891	5.33	0.66			
3-4	Initial Area	A-2	0.65	0% Undeveloped - Poor Cover	0	190	2315.80	2295.50	10.7	6.76	0% - Soil A 0% - Soil B 0% - Soil C 100% - Soil D	Grass, Poor Cover	AMC1: 76 AMC2: 89 AMC3: 96	0.892	6.53	3.78			
5-6	Initial Area	A-3	4.11	0% Undeveloped - Poor Cover	0	580	2324.00	2282.00	7.2	11.42	0% - Soil A 0% - Soil B 0% - Soil C 100% - Soil D	Grass, Poor Cover	AMC1: 76 AMC2: 89 AMC3: 96	0.890	4.84	17.70			
Summary Table of Proposed Condition																			
Total Area, Acres:			4.90																
Total Flow Rate, cfs:			22.15																
																	Sub-Area		
																	Flow Rate		
Note																			
Hydrology Procedure for Initial Area Per Plate D-1:Rational Method Instructions in Riverside County Hydrology Manual																			

Riverside County Rational Method Analysis

100 Year Proposed Condition Rational Method Hydrology Analysis																		
AMC														3	2 yr 1 Hr	0.613	100-yr 1 hr:	1.88
Major Drainage Area A																		
Node ID	Flow Description	Sub Area ID	Area (Acres)	Land Use	Impervious %	Flow Length (ft)	Upstream Elevation (ft)	Dwnstream Elevation (ft)	Slope (%)	Tc=Ti+Tt	Soil Distribution	Cover Type	Weighted RI Index	Runoff Coefficient C	I (in/hr)	Q=CIA		
1-2	Initial Area	A-1	1.55	90% Commercial	90	521	2316.70	2312.40	0.8	9.56	0% - Soil A 0% - Soil B 0% - Soil C 100% - Soil D	Urban Landscaping	AMC1: 57 AMC2: 75 AMC3: 88	0.897	5.36	7.45		
2-2.5	Pipe Flow	Total Area (Ac.):	1.55	-	-	70	2312.40	2299.30	18.7	0.06					I (in/hr):	5.36		
				Pipe Definition	Mannings N:	0	Pipe Slope (%)	18.71	Flow Rate (cfs):	avel Time, Ti (m)	0.056828619					Final Q	Final Tc	Final I
					Estimated Pipe Diameter (in):	12	# Pipes	1.00	Full-Pipe Capacity (cfs):	Flow Area (sf):	0.362717091					7.45	0.06	5.4
2-2.5	Confluence Analysis	Node	Q	Tc		Acreage	Stream Number	Volume	Runoff C									
			(cfs)	(min)	(in/hr)	(Ac)		(cuft)										
		2-2.5	7.45	0.06	5.36	2	1.00									Final Q	Final Tc	Final I
3-2.5	Initial Area	A-4	0.34	0% Undeveloped - Fair Cover	0	185	2315.00	2299.30	8.5	9.38	0% - Soil A 0% - Soil B 0% - Soil C 100% - Soil D	Urban Landscaping	AMC1: 57 AMC2: 75 AMC3: 88	0.871	5.41	1.60		
2.5	Confluence Analysis	Node	Q	Tc	I	Acreage	Stream Number	Volume	Runoff C									
			(cfs)	(min)	(in/hr)	(Ac)		(cuft)										
		2-2.5	7.45	0.06	5.36	2	1.00									Final Q	Final Tc	Final I
5-6	Initial Area	A-2	0.58	0% Undeveloped - Poor Cover	0	190	2315.80	2295.40	10.7	6.75	0% - Soil A 0% - Soil B 0% - Soil C 100% - Soil D	Grass, Poor Cover	AMC1: 76 AMC2: 89 AMC3: 96	0.892	6.53	3.38		
3-4	Initial Area	A-3	2.43	0% Undeveloped - Poor Cover	0	440	2317.50	2282.00	8.1	10.01	0% - Soil A 0% - Soil B 0% - Soil C 100% - Soil D	Grass, Poor Cover	AMC1: 76 AMC2: 89 AMC3: 96	0.891	5.22	11.29		

Summary Table of Proposed Condition	
Total Area, Acres:	4.90
Total Flow Rate, cfs:	23.70

Sub-Area
Flow Rate

Note

Hydrology Procedure for Initial Area Per Plate D-1:Rational Method Instructions in Riverside County Hydrology Manual

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 08/03/25 File: existing10110.out

+++++

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

Program License Serial Number 6513

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

English Units used in output format

APN 915-330-040
Existing Condition Unit Hydrograph
10-Year Design Storm

Drainage Area = 4.90 (Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 4.90 (Ac.) =
0.008 Sq. Mi.
Length along longest watercourse = 580.00 (Ft.)
Length along longest watercourse measured to centroid = 290.00 (Ft.)
Length along longest watercourse = 0.110 Mi.
Length along longest watercourse measured to centroid = 0.055 Mi.
Difference in elevation = 42.00 (Ft.)
Slope along watercourse = 382.3448 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.033 Hr.
Lag time = 2.00 Min.
25% of lag time = 0.50 Min.
40% of lag time = 0.80 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]
4.90	0.61	3.00

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
4.90	1.88	9.21

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.613 (In)
Area Averaged 100-Year Rainfall = 1.880 (In)

Point rain (area averaged) = 1.134 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.134 (In)

Sub-Area Data:

Area (Ac.)	Runoff Index	Impervious %
4.900	89.00	0.000
Total Area Entered = 4.90 (Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
89.0	89.0	0.141	0.000	0.141	1.000	0.141
Sum (F) =						0.141

Area averaged mean soil loss (F) (In/Hr) = 0.141
Minimum soil loss rate ((In/Hr)) = 0.071
(for 24 hour storm duration)
Soil loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm = 0.5800

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	249.770	50.866	2.512
2 0.167	499.540	40.068	1.979
3 0.250	749.311	7.028	0.347
4 0.333	999.081	2.038	0.101
Sum = 100.000		Sum =	4.938

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	3.60	0.490	0.141 (0.441)	0.349
2 0.17	4.20	0.572	0.141 (0.514)	0.430
3 0.25	4.40	0.599	0.141 (0.539)	0.457

4	0.33	4.60	0.626	0.141	(0.563)	0.485
5	0.42	5.00	0.681	0.141	(0.612)	0.539
6	0.50	5.60	0.762	0.141	(0.686)	0.621
7	0.58	6.40	0.871	0.141	(0.784)	0.730
8	0.67	8.10	1.102	0.141	(0.992)	0.961
9	0.75	13.10	1.783	0.141	(1.605)	1.642
10	0.83	34.50	4.696	0.141	(4.226)	4.554
11	0.92	6.70	0.912	0.141	(0.821)	0.770
12	1.00	3.80	0.517	0.141	(0.465)	0.376

(Loss Rate Not Used)

Sum = 100.0

Sum = 11.9

Flood volume = Effective rainfall 0.99(In)

times area 4.9(Ac.)/[(In)/(Ft.)] = 0.4(Ac.Ft)

Total soil loss = 0.14(In)

Total soil loss = 0.058(Ac.Ft)

Total rainfall = 1.13(In)

Flood volume = 17659.0 Cubic Feet

Total soil loss = 2515.1 Cubic Feet

Peak flow rate of this hydrograph = 15.103(CFS)

+++++

1 - 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	0.0060	0.88	VQ				
0+10	0.0182	1.77	V Q				
0+15	0.0329	2.12	VQ				
0+20	0.0487	2.31	Q				
0+25	0.0661	2.52	QV				
0+30	0.0857	2.84	Q V				
0+35	0.1084	3.30	Q V				
0+40	0.1368	4.13	Q V				
0+45	0.1805	6.34	Q V				
0+50	0.2845	15.10				V Q	
0+55	0.3645	11.62			Q		V
1+ 0	0.3936	4.22		Q			V
1+ 5	0.4037	1.47	Q				V
1+10	0.4051	0.21	Q				V
1+15	0.4054	0.04	Q				V

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 08/03/25 File: existing10310.out

+++++

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

Program License Serial Number 6513

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

English Units used in output format

APN 915-330-040
Existing Condition Unit Hydrograph
10-Year Design Storm

Drainage Area = 4.90 (Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 4.90 (Ac.) =
0.008 Sq. Mi.
Length along longest watercourse = 580.00 (Ft.)
Length along longest watercourse measured to centroid = 290.00 (Ft.)
Length along longest watercourse = 0.110 Mi.
Length along longest watercourse measured to centroid = 0.055 Mi.
Difference in elevation = 42.00 (Ft.)
Slope along watercourse = 382.3448 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.033 Hr.
Lag time = 2.00 Min.
25% of lag time = 0.50 Min.
40% of lag time = 0.80 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00 (CFS)

2 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
4.90	1.02	5.00

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
4.90	2.79	13.67

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.020 (In)
Area Averaged 100-Year Rainfall = 2.790 (In)

Point rain (area averaged) = 1.748 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.748 (In)

Sub-Area Data:

Area (Ac.)	Runoff Index	Impervious %
4.900	89.00	0.000
Total Area Entered = 4.90 (Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
89.0	89.0	0.141	0.000	0.141	1.000	0.141
Sum (F) =						0.141

Area averaged mean soil loss (F) (In/Hr) = 0.141
Minimum soil loss rate ((In/Hr)) = 0.071
(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	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	249.770	50.866	2.512
2 0.167	499.540	40.068	1.979
3 0.250	749.311	7.028	0.347
4 0.333	999.081	2.038	0.101
Sum = 100.000		Sum=	4.938

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	1.30	0.273	0.141 (0.245)	0.131
2 0.17	1.30	0.273	0.141 (0.245)	0.131
3 0.25	1.10	0.231	0.141 (0.208)	0.089
4 0.33	1.50	0.315	0.141 (0.283)	0.173
5 0.42	1.50	0.315	0.141 (0.283)	0.173

6	0.50	1.80	0.378	0.141	(0.340)	0.236
7	0.58	1.50	0.315	0.141	(0.283)	0.173
8	0.67	1.80	0.378	0.141	(0.340)	0.236
9	0.75	1.80	0.378	0.141	(0.340)	0.236
10	0.83	1.50	0.315	0.141	(0.283)	0.173
11	0.92	1.60	0.336	0.141	(0.302)	0.194
12	1.00	1.80	0.378	0.141	(0.340)	0.236
13	1.08	2.20	0.462	0.141	(0.415)	0.320
14	1.17	2.20	0.462	0.141	(0.415)	0.320
15	1.25	2.20	0.462	0.141	(0.415)	0.320
16	1.33	2.00	0.420	0.141	(0.378)	0.278
17	1.42	2.60	0.545	0.141	(0.491)	0.404
18	1.50	2.70	0.566	0.141	(0.510)	0.425
19	1.58	2.40	0.503	0.141	(0.453)	0.362
20	1.67	2.70	0.566	0.141	(0.510)	0.425
21	1.75	3.30	0.692	0.141	(0.623)	0.551
22	1.83	3.10	0.650	0.141	(0.585)	0.509
23	1.92	2.90	0.608	0.141	(0.548)	0.467
24	2.00	3.00	0.629	0.141	(0.566)	0.488
25	2.08	3.10	0.650	0.141	(0.585)	0.509
26	2.17	4.20	0.881	0.141	(0.793)	0.740
27	2.25	5.00	1.049	0.141	(0.944)	0.907
28	2.33	3.50	0.734	0.141	(0.661)	0.593
29	2.42	6.80	1.426	0.141	(1.284)	1.285
30	2.50	7.30	1.531	0.141	(1.378)	1.390
31	2.58	8.20	1.720	0.141	(1.548)	1.579
32	2.67	5.90	1.238	0.141	(1.114)	1.096
33	2.75	2.00	0.420	0.141	(0.378)	0.278
34	2.83	1.80	0.378	0.141	(0.340)	0.236
35	2.92	1.80	0.378	0.141	(0.340)	0.236
36	3.00	0.60	0.126	(0.141)	0.113	0.013

(Loss Rate Not Used)

Sum = 100.0

Sum = 15.9

Flood volume = Effective rainfall 1.33(In)

times area 4.9(Ac.) / [(In)/(Ft.)] = 0.5(Ac.Ft)

Total soil loss = 0.42(In)

Total soil loss = 0.172(Ac.Ft)

Total rainfall = 1.75(In)

Flood volume = 23590.9 Cubic Feet

Total soil loss = 7503.6 Cubic Feet

Peak flow rate of this hydrograph = 7.225(CFS)

+++++

3 - 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	0.0023	0.33	VQ				
0+10	0.0063	0.59	V Q				
0+15	0.0100	0.53	V Q				
0+20	0.0146	0.67	VQ				

0+25	0.0203	0.82	V Q				
0+30	0.0272	1.01	V Q				
0+35	0.0340	0.98	VQ				
0+40	0.0411	1.04	VQ				
0+45	0.0490	1.15	VQ				
0+50	0.0559	1.00	Q				
0+55	0.0623	0.94	QV				
1+ 0	0.0697	1.06	QV				
1+ 5	0.0790	1.36	Q				
1+10	0.0896	1.54	Q				
1+15	0.1004	1.57	QV				
1+20	0.1106	1.48	Q V				
1+25	0.1224	1.71	Q V				
1+30	0.1361	2.00	Q V				
1+35	0.1493	1.92	Q V				
1+40	0.1629	1.97	Q V				
1+45	0.1794	2.39	Q V				
1+50	0.1970	2.55	Q V				
1+55	0.2136	2.42	Q V				
2+ 0	0.2301	2.38	Q V				
2+ 5	0.2470	2.46	Q V				
2+10	0.2682	3.08	Q V				
2+15	0.2956	3.97	Q V				
2+20	0.3203	3.59	Q V				
2+25	0.3533	4.79	Q V				
2+30	0.3970	6.33	Q V				
2+35	0.4467	7.23	Q V				
2+40	0.4914	6.49	Q V				
2+45	0.5159	3.56	Q V				
2+50	0.5275	1.68	Q V				
2+55	0.5363	1.27	Q V				
3+ 0	0.5405	0.61	Q V				
3+ 5	0.5414	0.13	Q V				
3+10	0.5416	0.03	Q V				
3+15	0.5416	0.00	Q V				

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 08/03/25 File: existing10610.out

+++++

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

Program License Serial Number 6513

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

English Units used in output format

APN 915-330-040
Existing Condition Unit Hydrograph
10-Year Design Storm

Drainage Area = 4.90 (Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 4.90 (Ac.) =
0.008 Sq. Mi.
Length along longest watercourse = 580.00 (Ft.)
Length along longest watercourse measured to centroid = 290.00 (Ft.)
Length along longest watercourse = 0.110 Mi.
Length along longest watercourse measured to centroid = 0.055 Mi.
Difference in elevation = 42.00 (Ft.)
Slope along watercourse = 382.3448 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.033 Hr.
Lag time = 2.00 Min.
25% of lag time = 0.50 Min.
40% of lag time = 0.80 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]
4.90	1.42	6.96

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
4.90	2.79	13.67

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.420 (In)
Area Averaged 100-Year Rainfall = 2.790 (In)

Point rain (area averaged) = 1.984 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.984 (In)

Sub-Area Data:

Area (Ac.)	Runoff Index	Impervious %
4.900	89.00	0.000
Total Area Entered = 4.90 (Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
89.0	89.0	0.141	0.000	0.141	1.000	0.141
Sum (F) =						0.141

Area averaged mean soil loss (F) (In/Hr) = 0.141
Minimum soil loss rate ((In/Hr)) = 0.071
(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	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	249.770	50.866	2.512
2 0.167	499.540	40.068	1.979
3 0.250	749.311	7.028	0.347
4 0.333	999.081	2.038	0.101
Sum = 100.000		Sum=	4.938

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	0.119	(0.141)	0.107 0.012
2 0.17	0.60	0.143	(0.141)	0.129 0.014
3 0.25	0.60	0.143	(0.141)	0.129 0.014
4 0.33	0.60	0.143	(0.141)	0.129 0.014
5 0.42	0.60	0.143	(0.141)	0.129 0.014

6	0.50	0.70	0.167	0.141	(0.150)	0.025
7	0.58	0.70	0.167	0.141	(0.150)	0.025
8	0.67	0.70	0.167	0.141	(0.150)	0.025
9	0.75	0.70	0.167	0.141	(0.150)	0.025
10	0.83	0.70	0.167	0.141	(0.150)	0.025
11	0.92	0.70	0.167	0.141	(0.150)	0.025
12	1.00	0.80	0.190	0.141	(0.171)	0.049
13	1.08	0.80	0.190	0.141	(0.171)	0.049
14	1.17	0.80	0.190	0.141	(0.171)	0.049
15	1.25	0.80	0.190	0.141	(0.171)	0.049
16	1.33	0.80	0.190	0.141	(0.171)	0.049
17	1.42	0.80	0.190	0.141	(0.171)	0.049
18	1.50	0.80	0.190	0.141	(0.171)	0.049
19	1.58	0.80	0.190	0.141	(0.171)	0.049
20	1.67	0.80	0.190	0.141	(0.171)	0.049
21	1.75	0.80	0.190	0.141	(0.171)	0.049
22	1.83	0.80	0.190	0.141	(0.171)	0.049
23	1.92	0.80	0.190	0.141	(0.171)	0.049
24	2.00	0.90	0.214	0.141	(0.193)	0.073
25	2.08	0.80	0.190	0.141	(0.171)	0.049
26	2.17	0.90	0.214	0.141	(0.193)	0.073
27	2.25	0.90	0.214	0.141	(0.193)	0.073
28	2.33	0.90	0.214	0.141	(0.193)	0.073
29	2.42	0.90	0.214	0.141	(0.193)	0.073
30	2.50	0.90	0.214	0.141	(0.193)	0.073
31	2.58	0.90	0.214	0.141	(0.193)	0.073
32	2.67	0.90	0.214	0.141	(0.193)	0.073
33	2.75	1.00	0.238	0.141	(0.214)	0.097
34	2.83	1.00	0.238	0.141	(0.214)	0.097
35	2.92	1.00	0.238	0.141	(0.214)	0.097
36	3.00	1.00	0.238	0.141	(0.214)	0.097
37	3.08	1.00	0.238	0.141	(0.214)	0.097
38	3.17	1.10	0.262	0.141	(0.236)	0.120
39	3.25	1.10	0.262	0.141	(0.236)	0.120
40	3.33	1.10	0.262	0.141	(0.236)	0.120
41	3.42	1.20	0.286	0.141	(0.257)	0.144
42	3.50	1.30	0.309	0.141	(0.278)	0.168
43	3.58	1.40	0.333	0.141	(0.300)	0.192
44	3.67	1.40	0.333	0.141	(0.300)	0.192
45	3.75	1.50	0.357	0.141	(0.321)	0.216
46	3.83	1.50	0.357	0.141	(0.321)	0.216
47	3.92	1.60	0.381	0.141	(0.343)	0.239
48	4.00	1.60	0.381	0.141	(0.343)	0.239
49	4.08	1.70	0.405	0.141	(0.364)	0.263
50	4.17	1.80	0.428	0.141	(0.386)	0.287
51	4.25	1.90	0.452	0.141	(0.407)	0.311
52	4.33	2.00	0.476	0.141	(0.428)	0.335
53	4.42	2.10	0.500	0.141	(0.450)	0.358
54	4.50	2.10	0.500	0.141	(0.450)	0.358
55	4.58	2.20	0.524	0.141	(0.471)	0.382
56	4.67	2.30	0.547	0.141	(0.493)	0.406
57	4.75	2.40	0.571	0.141	(0.514)	0.430
58	4.83	2.40	0.571	0.141	(0.514)	0.430
59	4.92	2.50	0.595	0.141	(0.536)	0.454
60	5.00	2.60	0.619	0.141	(0.557)	0.477
61	5.08	3.10	0.738	0.141	(0.664)	0.596

62	5.17	3.60	0.857	0.141	(0.771)	0.716
63	5.25	3.90	0.928	0.141	(0.835)	0.787
64	5.33	4.20	1.000	0.141	(0.900)	0.858
65	5.42	4.70	1.119	0.141	(1.007)	0.977
66	5.50	5.60	1.333	0.141	(1.200)	1.192
67	5.58	1.90	0.452	0.141	(0.407)	0.311
68	5.67	0.90	0.214	0.141	(0.193)	0.073
69	5.75	0.60	0.143	(0.141)	0.129	0.014
70	5.83	0.50	0.119	(0.141)	0.107	0.012
71	5.92	0.30	0.071	(0.141)	0.064	0.007
72	6.00	0.20	0.048	(0.141)	0.043	0.005

(Loss Rate Not Used)

Sum = 100.0

Sum = 13.9

Flood volume = Effective rainfall 1.16(In)

times area 4.9(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)

Total soil loss = 0.82(In)

Total soil loss = 0.336(Ac.Ft)

Total rainfall = 1.98(In)

Flood volume = 20649.1 Cubic Feet

Total soil loss = 14633.1 Cubic Feet

Peak flow rate of this hydrograph = 5.307(CFS)

+++++

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	0.0002	0.03	Q				
0+10	0.0006	0.06	Q				
0+15	0.0011	0.07	Q				
0+20	0.0016	0.07	Q				
0+25	0.0021	0.07	Q				
0+30	0.0027	0.10	Q				
0+35	0.0036	0.12	Q				
0+40	0.0044	0.12	Q				
0+45	0.0053	0.12	Q				
0+50	0.0061	0.12	Q				
0+55	0.0070	0.12	Q				
1+ 0	0.0083	0.18	Q				
1+ 5	0.0098	0.23	Q				
1+10	0.0115	0.24	Q				
1+15	0.0132	0.24	QV				
1+20	0.0148	0.24	QV				
1+25	0.0165	0.24	QV				
1+30	0.0182	0.24	QV				
1+35	0.0198	0.24	QV				
1+40	0.0215	0.24	QV				
1+45	0.0232	0.24	QV				
1+50	0.0248	0.24	Q V				
1+55	0.0265	0.24	Q V				
2+ 0	0.0286	0.30	QV				

2+ 5	0.0306	0.29	QV				
2+10	0.0327	0.31	QV				
2+15	0.0351	0.35	QV				
2+20	0.0376	0.36	Q V				
2+25	0.0401	0.36	Q V				
2+30	0.0426	0.36	Q V				
2+35	0.0450	0.36	Q V				
2+40	0.0475	0.36	Q V				
2+45	0.0504	0.42	Q V				
2+50	0.0536	0.47	Q V				
2+55	0.0569	0.48	Q V				
3+ 0	0.0602	0.48	Q V				
3+ 5	0.0635	0.48	Q V				
3+10	0.0672	0.54	Q V				
3+15	0.0712	0.58	Q V				
3+20	0.0753	0.59	Q V				
3+25	0.0798	0.65	Q V				
3+30	0.0850	0.76	Q V				
3+35	0.0911	0.88	Q V				
3+40	0.0975	0.93	Q V				
3+45	0.1044	1.01	Q V				
3+50	0.1117	1.05	Q V				
3+55	0.1194	1.12	Q V				
4+ 0	0.1275	1.17	Q V				
4+ 5	0.1361	1.24	Q V				
4+10	0.1453	1.35	Q V				
4+15	0.1554	1.47	Q V				
4+20	0.1663	1.58	Q V				
4+25	0.1780	1.70	Q V				
4+30	0.1902	1.76	Q V				
4+35	0.2027	1.83	Q V				
4+40	0.2161	1.94	Q V				
4+45	0.2302	2.05	Q V				
4+50	0.2448	2.11	Q V				
4+55	0.2598	2.18	Q V				
5+ 0	0.2756	2.29	Q V				
5+ 5	0.2938	2.65	Q V				
5+10	0.3158	3.19	Q V				
5+15	0.3409	3.65	Q V				
5+20	0.3686	4.02	Q V				
5+25	0.3996	4.50	Q V				
5+30	0.4362	5.31	Q V				
5+35	0.4607	3.57	Q V				
5+40	0.4697	1.31	Q V				
5+45	0.4725	0.41	Q V				
5+50	0.4733	0.11	Q V				
5+55	0.4737	0.05	Q V				
6+ 0	0.4739	0.03	Q V				
6+ 5	0.4740	0.01	Q V				
6+10	0.4740	0.00	Q V				
6+15	0.4740	0.00	Q V				

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 08/03/25 File: existing102410.out

+++++

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

Program License Serial Number 6513

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

English Units used in output format

APN 915-330-040
Existing Condition Unit Hydrograph
10-Year Design Storm

Drainage Area = 4.90 (Ac.) = 0.008 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 4.90 (Ac.) =
0.008 Sq. Mi.
Length along longest watercourse = 580.00 (Ft.)
Length along longest watercourse measured to centroid = 290.00 (Ft.)
Length along longest watercourse = 0.110 Mi.
Length along longest watercourse measured to centroid = 0.055 Mi.
Difference in elevation = 42.00 (Ft.)
Slope along watercourse = 382.3448 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.033 Hr.
Lag time = 2.00 Min.
25% of lag time = 0.50 Min.
40% of lag time = 0.80 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]
4.90	2.51	12.30

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
4.90	6.97	34.15

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.510 (In)
Area Averaged 100-Year Rainfall = 6.970 (In)

Point rain (area averaged) = 4.345 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.345 (In)

Sub-Area Data:

Area (Ac.)	Runoff Index	Impervious %
4.900	89.00	0.000
Total Area Entered = 4.90 (Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
89.0	89.0	0.141	0.000	0.141	1.000	0.141
Sum (F) =						0.141

Area averaged mean soil loss (F) (In/Hr) = 0.141
Minimum soil loss rate ((In/Hr)) = 0.071
(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	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	249.770	50.866	2.512
2 0.167	499.540	40.068	1.979
3 0.250	749.311	7.028	0.347
4 0.333	999.081	2.038	0.101
Sum = 100.000		Sum=	4.938

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	0.07	0.035	(0.251) 0.031	0.003
2 0.17	0.07	0.035	(0.250) 0.031	0.003
3 0.25	0.07	0.035	(0.249) 0.031	0.003
4 0.33	0.10	0.052	(0.248) 0.047	0.005
5 0.42	0.10	0.052	(0.247) 0.047	0.005

6	0.50	0.10	0.052	(0.246)	0.047	0.005
7	0.58	0.10	0.052	(0.245)	0.047	0.005
8	0.67	0.10	0.052	(0.244)	0.047	0.005
9	0.75	0.10	0.052	(0.243)	0.047	0.005
10	0.83	0.13	0.070	(0.242)	0.063	0.007
11	0.92	0.13	0.070	(0.241)	0.063	0.007
12	1.00	0.13	0.070	(0.240)	0.063	0.007
13	1.08	0.10	0.052	(0.239)	0.047	0.005
14	1.17	0.10	0.052	(0.238)	0.047	0.005
15	1.25	0.10	0.052	(0.237)	0.047	0.005
16	1.33	0.10	0.052	(0.236)	0.047	0.005
17	1.42	0.10	0.052	(0.235)	0.047	0.005
18	1.50	0.10	0.052	(0.234)	0.047	0.005
19	1.58	0.10	0.052	(0.234)	0.047	0.005
20	1.67	0.10	0.052	(0.233)	0.047	0.005
21	1.75	0.10	0.052	(0.232)	0.047	0.005
22	1.83	0.13	0.070	(0.231)	0.063	0.007
23	1.92	0.13	0.070	(0.230)	0.063	0.007
24	2.00	0.13	0.070	(0.229)	0.063	0.007
25	2.08	0.13	0.070	(0.228)	0.063	0.007
26	2.17	0.13	0.070	(0.227)	0.063	0.007
27	2.25	0.13	0.070	(0.226)	0.063	0.007
28	2.33	0.13	0.070	(0.225)	0.063	0.007
29	2.42	0.13	0.070	(0.224)	0.063	0.007
30	2.50	0.13	0.070	(0.223)	0.063	0.007
31	2.58	0.17	0.087	(0.222)	0.078	0.009
32	2.67	0.17	0.087	(0.221)	0.078	0.009
33	2.75	0.17	0.087	(0.221)	0.078	0.009
34	2.83	0.17	0.087	(0.220)	0.078	0.009
35	2.92	0.17	0.087	(0.219)	0.078	0.009
36	3.00	0.17	0.087	(0.218)	0.078	0.009
37	3.08	0.17	0.087	(0.217)	0.078	0.009
38	3.17	0.17	0.087	(0.216)	0.078	0.009
39	3.25	0.17	0.087	(0.215)	0.078	0.009
40	3.33	0.17	0.087	(0.214)	0.078	0.009
41	3.42	0.17	0.087	(0.213)	0.078	0.009
42	3.50	0.17	0.087	(0.212)	0.078	0.009
43	3.58	0.17	0.087	(0.212)	0.078	0.009
44	3.67	0.17	0.087	(0.211)	0.078	0.009
45	3.75	0.17	0.087	(0.210)	0.078	0.009
46	3.83	0.20	0.104	(0.209)	0.094	0.010
47	3.92	0.20	0.104	(0.208)	0.094	0.010
48	4.00	0.20	0.104	(0.207)	0.094	0.010
49	4.08	0.20	0.104	(0.206)	0.094	0.010
50	4.17	0.20	0.104	(0.205)	0.094	0.010
51	4.25	0.20	0.104	(0.205)	0.094	0.010
52	4.33	0.23	0.122	(0.204)	0.109	0.012
53	4.42	0.23	0.122	(0.203)	0.109	0.012
54	4.50	0.23	0.122	(0.202)	0.109	0.012
55	4.58	0.23	0.122	(0.201)	0.109	0.012
56	4.67	0.23	0.122	(0.200)	0.109	0.012
57	4.75	0.23	0.122	(0.199)	0.109	0.012
58	4.83	0.27	0.139	(0.198)	0.125	0.014
59	4.92	0.27	0.139	(0.198)	0.125	0.014
60	5.00	0.27	0.139	(0.197)	0.125	0.014
61	5.08	0.20	0.104	(0.196)	0.094	0.010

62	5.17	0.20	0.104	(0.195)	0.094	0.010
63	5.25	0.20	0.104	(0.194)	0.094	0.010
64	5.33	0.23	0.122	(0.193)	0.109	0.012
65	5.42	0.23	0.122	(0.193)	0.109	0.012
66	5.50	0.23	0.122	(0.192)	0.109	0.012
67	5.58	0.27	0.139	(0.191)	0.125	0.014
68	5.67	0.27	0.139	(0.190)	0.125	0.014
69	5.75	0.27	0.139	(0.189)	0.125	0.014
70	5.83	0.27	0.139	(0.188)	0.125	0.014
71	5.92	0.27	0.139	(0.187)	0.125	0.014
72	6.00	0.27	0.139	(0.187)	0.125	0.014
73	6.08	0.30	0.156	(0.186)	0.141	0.016
74	6.17	0.30	0.156	(0.185)	0.141	0.016
75	6.25	0.30	0.156	(0.184)	0.141	0.016
76	6.33	0.30	0.156	(0.183)	0.141	0.016
77	6.42	0.30	0.156	(0.183)	0.141	0.016
78	6.50	0.30	0.156	(0.182)	0.141	0.016
79	6.58	0.33	0.174	(0.181)	0.156	0.017
80	6.67	0.33	0.174	(0.180)	0.156	0.017
81	6.75	0.33	0.174	(0.179)	0.156	0.017
82	6.83	0.33	0.174	(0.178)	0.156	0.017
83	6.92	0.33	0.174	(0.178)	0.156	0.017
84	7.00	0.33	0.174	(0.177)	0.156	0.017
85	7.08	0.33	0.174	(0.176)	0.156	0.017
86	7.17	0.33	0.174	(0.175)	0.156	0.017
87	7.25	0.33	0.174	(0.174)	0.156	0.017
88	7.33	0.37	0.191	(0.174)	0.172	0.019
89	7.42	0.37	0.191	(0.173)	0.172	0.019
90	7.50	0.37	0.191	0.172	(0.172)	0.019
91	7.58	0.40	0.209	0.171	(0.188)	0.037
92	7.67	0.40	0.209	0.170	(0.188)	0.038
93	7.75	0.40	0.209	0.170	(0.188)	0.039
94	7.83	0.43	0.226	0.169	(0.203)	0.057
95	7.92	0.43	0.226	0.168	(0.203)	0.058
96	8.00	0.43	0.226	0.167	(0.203)	0.059
97	8.08	0.50	0.261	0.167	(0.235)	0.094
98	8.17	0.50	0.261	0.166	(0.235)	0.095
99	8.25	0.50	0.261	0.165	(0.235)	0.096
100	8.33	0.50	0.261	0.164	(0.235)	0.096
101	8.42	0.50	0.261	0.163	(0.235)	0.097
102	8.50	0.50	0.261	0.163	(0.235)	0.098
103	8.58	0.53	0.278	0.162	(0.250)	0.116
104	8.67	0.53	0.278	0.161	(0.250)	0.117
105	8.75	0.53	0.278	0.160	(0.250)	0.118
106	8.83	0.57	0.295	0.160	(0.266)	0.136
107	8.92	0.57	0.295	0.159	(0.266)	0.137
108	9.00	0.57	0.295	0.158	(0.266)	0.137
109	9.08	0.63	0.330	0.157	(0.297)	0.173
110	9.17	0.63	0.330	0.157	(0.297)	0.174
111	9.25	0.63	0.330	0.156	(0.297)	0.174
112	9.33	0.67	0.348	0.155	(0.313)	0.192
113	9.42	0.67	0.348	0.154	(0.313)	0.193
114	9.50	0.67	0.348	0.154	(0.313)	0.194
115	9.58	0.70	0.365	0.153	(0.328)	0.212
116	9.67	0.70	0.365	0.152	(0.328)	0.213
117	9.75	0.70	0.365	0.151	(0.328)	0.213

118	9.83	0.73	0.382	0.151	(0.344)	0.232
119	9.92	0.73	0.382	0.150	(0.344)	0.232
120	10.00	0.73	0.382	0.149	(0.344)	0.233
121	10.08	0.50	0.261	0.149	(0.235)	0.112
122	10.17	0.50	0.261	0.148	(0.235)	0.113
123	10.25	0.50	0.261	0.147	(0.235)	0.114
124	10.33	0.50	0.261	0.146	(0.235)	0.114
125	10.42	0.50	0.261	0.146	(0.235)	0.115
126	10.50	0.50	0.261	0.145	(0.235)	0.116
127	10.58	0.67	0.348	0.144	(0.313)	0.203
128	10.67	0.67	0.348	0.144	(0.313)	0.204
129	10.75	0.67	0.348	0.143	(0.313)	0.205
130	10.83	0.67	0.348	0.142	(0.313)	0.205
131	10.92	0.67	0.348	0.142	(0.313)	0.206
132	11.00	0.67	0.348	0.141	(0.313)	0.207
133	11.08	0.63	0.330	0.140	(0.297)	0.190
134	11.17	0.63	0.330	0.139	(0.297)	0.191
135	11.25	0.63	0.330	0.139	(0.297)	0.191
136	11.33	0.63	0.330	0.138	(0.297)	0.192
137	11.42	0.63	0.330	0.137	(0.297)	0.193
138	11.50	0.63	0.330	0.137	(0.297)	0.194
139	11.58	0.57	0.295	0.136	(0.266)	0.159
140	11.67	0.57	0.295	0.135	(0.266)	0.160
141	11.75	0.57	0.295	0.135	(0.266)	0.161
142	11.83	0.60	0.313	0.134	(0.282)	0.179
143	11.92	0.60	0.313	0.133	(0.282)	0.180
144	12.00	0.60	0.313	0.133	(0.282)	0.180
145	12.08	0.83	0.434	0.132	(0.391)	0.302
146	12.17	0.83	0.434	0.131	(0.391)	0.303
147	12.25	0.83	0.434	0.131	(0.391)	0.304
148	12.33	0.87	0.452	0.130	(0.407)	0.322
149	12.42	0.87	0.452	0.129	(0.407)	0.322
150	12.50	0.87	0.452	0.129	(0.407)	0.323
151	12.58	0.93	0.487	0.128	(0.438)	0.359
152	12.67	0.93	0.487	0.127	(0.438)	0.359
153	12.75	0.93	0.487	0.127	(0.438)	0.360
154	12.83	0.97	0.504	0.126	(0.454)	0.378
155	12.92	0.97	0.504	0.126	(0.454)	0.378
156	13.00	0.97	0.504	0.125	(0.454)	0.379
157	13.08	1.13	0.591	0.124	(0.532)	0.467
158	13.17	1.13	0.591	0.124	(0.532)	0.467
159	13.25	1.13	0.591	0.123	(0.532)	0.468
160	13.33	1.13	0.591	0.122	(0.532)	0.469
161	13.42	1.13	0.591	0.122	(0.532)	0.469
162	13.50	1.13	0.591	0.121	(0.532)	0.470
163	13.58	0.77	0.400	0.120	(0.360)	0.279
164	13.67	0.77	0.400	0.120	(0.360)	0.280
165	13.75	0.77	0.400	0.119	(0.360)	0.280
166	13.83	0.77	0.400	0.119	(0.360)	0.281
167	13.92	0.77	0.400	0.118	(0.360)	0.282
168	14.00	0.77	0.400	0.117	(0.360)	0.282
169	14.08	0.90	0.469	0.117	(0.422)	0.352
170	14.17	0.90	0.469	0.116	(0.422)	0.353
171	14.25	0.90	0.469	0.116	(0.422)	0.354
172	14.33	0.87	0.452	0.115	(0.407)	0.337
173	14.42	0.87	0.452	0.114	(0.407)	0.337

174	14.50	0.87	0.452	0.114	(0.407)	0.338
175	14.58	0.87	0.452	0.113	(0.407)	0.339
176	14.67	0.87	0.452	0.113	(0.407)	0.339
177	14.75	0.87	0.452	0.112	(0.407)	0.340
178	14.83	0.83	0.434	0.112	(0.391)	0.323
179	14.92	0.83	0.434	0.111	(0.391)	0.323
180	15.00	0.83	0.434	0.110	(0.391)	0.324
181	15.08	0.80	0.417	0.110	(0.375)	0.307
182	15.17	0.80	0.417	0.109	(0.375)	0.308
183	15.25	0.80	0.417	0.109	(0.375)	0.308
184	15.33	0.77	0.400	0.108	(0.360)	0.292
185	15.42	0.77	0.400	0.108	(0.360)	0.292
186	15.50	0.77	0.400	0.107	(0.360)	0.293
187	15.58	0.63	0.330	0.107	(0.297)	0.224
188	15.67	0.63	0.330	0.106	(0.297)	0.224
189	15.75	0.63	0.330	0.105	(0.297)	0.225
190	15.83	0.63	0.330	0.105	(0.297)	0.225
191	15.92	0.63	0.330	0.104	(0.297)	0.226
192	16.00	0.63	0.330	0.104	(0.297)	0.226
193	16.08	0.13	0.070	(0.103)	0.063	0.007
194	16.17	0.13	0.070	(0.103)	0.063	0.007
195	16.25	0.13	0.070	(0.102)	0.063	0.007
196	16.33	0.13	0.070	(0.102)	0.063	0.007
197	16.42	0.13	0.070	(0.101)	0.063	0.007
198	16.50	0.13	0.070	(0.101)	0.063	0.007
199	16.58	0.10	0.052	(0.100)	0.047	0.005
200	16.67	0.10	0.052	(0.100)	0.047	0.005
201	16.75	0.10	0.052	(0.099)	0.047	0.005
202	16.83	0.10	0.052	(0.099)	0.047	0.005
203	16.92	0.10	0.052	(0.098)	0.047	0.005
204	17.00	0.10	0.052	(0.098)	0.047	0.005
205	17.08	0.17	0.087	(0.097)	0.078	0.009
206	17.17	0.17	0.087	(0.097)	0.078	0.009
207	17.25	0.17	0.087	(0.096)	0.078	0.009
208	17.33	0.17	0.087	(0.096)	0.078	0.009
209	17.42	0.17	0.087	(0.095)	0.078	0.009
210	17.50	0.17	0.087	(0.095)	0.078	0.009
211	17.58	0.17	0.087	(0.094)	0.078	0.009
212	17.67	0.17	0.087	(0.094)	0.078	0.009
213	17.75	0.17	0.087	(0.093)	0.078	0.009
214	17.83	0.13	0.070	(0.093)	0.063	0.007
215	17.92	0.13	0.070	(0.092)	0.063	0.007
216	18.00	0.13	0.070	(0.092)	0.063	0.007
217	18.08	0.13	0.070	(0.092)	0.063	0.007
218	18.17	0.13	0.070	(0.091)	0.063	0.007
219	18.25	0.13	0.070	(0.091)	0.063	0.007
220	18.33	0.13	0.070	(0.090)	0.063	0.007
221	18.42	0.13	0.070	(0.090)	0.063	0.007
222	18.50	0.13	0.070	(0.089)	0.063	0.007
223	18.58	0.10	0.052	(0.089)	0.047	0.005
224	18.67	0.10	0.052	(0.088)	0.047	0.005
225	18.75	0.10	0.052	(0.088)	0.047	0.005
226	18.83	0.07	0.035	(0.088)	0.031	0.003
227	18.92	0.07	0.035	(0.087)	0.031	0.003
228	19.00	0.07	0.035	(0.087)	0.031	0.003
229	19.08	0.10	0.052	(0.086)	0.047	0.005

230	19.17	0.10	0.052	(0.086)	0.047	0.005
231	19.25	0.10	0.052	(0.086)	0.047	0.005
232	19.33	0.13	0.070	(0.085)	0.063	0.007
233	19.42	0.13	0.070	(0.085)	0.063	0.007
234	19.50	0.13	0.070	(0.084)	0.063	0.007
235	19.58	0.10	0.052	(0.084)	0.047	0.005
236	19.67	0.10	0.052	(0.084)	0.047	0.005
237	19.75	0.10	0.052	(0.083)	0.047	0.005
238	19.83	0.07	0.035	(0.083)	0.031	0.003
239	19.92	0.07	0.035	(0.082)	0.031	0.003
240	20.00	0.07	0.035	(0.082)	0.031	0.003
241	20.08	0.10	0.052	(0.082)	0.047	0.005
242	20.17	0.10	0.052	(0.081)	0.047	0.005
243	20.25	0.10	0.052	(0.081)	0.047	0.005
244	20.33	0.10	0.052	(0.081)	0.047	0.005
245	20.42	0.10	0.052	(0.080)	0.047	0.005
246	20.50	0.10	0.052	(0.080)	0.047	0.005
247	20.58	0.10	0.052	(0.080)	0.047	0.005
248	20.67	0.10	0.052	(0.079)	0.047	0.005
249	20.75	0.10	0.052	(0.079)	0.047	0.005
250	20.83	0.07	0.035	(0.079)	0.031	0.003
251	20.92	0.07	0.035	(0.078)	0.031	0.003
252	21.00	0.07	0.035	(0.078)	0.031	0.003
253	21.08	0.10	0.052	(0.078)	0.047	0.005
254	21.17	0.10	0.052	(0.077)	0.047	0.005
255	21.25	0.10	0.052	(0.077)	0.047	0.005
256	21.33	0.07	0.035	(0.077)	0.031	0.003
257	21.42	0.07	0.035	(0.077)	0.031	0.003
258	21.50	0.07	0.035	(0.076)	0.031	0.003
259	21.58	0.10	0.052	(0.076)	0.047	0.005
260	21.67	0.10	0.052	(0.076)	0.047	0.005
261	21.75	0.10	0.052	(0.075)	0.047	0.005
262	21.83	0.07	0.035	(0.075)	0.031	0.003
263	21.92	0.07	0.035	(0.075)	0.031	0.003
264	22.00	0.07	0.035	(0.075)	0.031	0.003
265	22.08	0.10	0.052	(0.074)	0.047	0.005
266	22.17	0.10	0.052	(0.074)	0.047	0.005
267	22.25	0.10	0.052	(0.074)	0.047	0.005
268	22.33	0.07	0.035	(0.074)	0.031	0.003
269	22.42	0.07	0.035	(0.073)	0.031	0.003
270	22.50	0.07	0.035	(0.073)	0.031	0.003
271	22.58	0.07	0.035	(0.073)	0.031	0.003
272	22.67	0.07	0.035	(0.073)	0.031	0.003
273	22.75	0.07	0.035	(0.073)	0.031	0.003
274	22.83	0.07	0.035	(0.072)	0.031	0.003
275	22.92	0.07	0.035	(0.072)	0.031	0.003
276	23.00	0.07	0.035	(0.072)	0.031	0.003
277	23.08	0.07	0.035	(0.072)	0.031	0.003
278	23.17	0.07	0.035	(0.072)	0.031	0.003
279	23.25	0.07	0.035	(0.072)	0.031	0.003
280	23.33	0.07	0.035	(0.071)	0.031	0.003
281	23.42	0.07	0.035	(0.071)	0.031	0.003
282	23.50	0.07	0.035	(0.071)	0.031	0.003
283	23.58	0.07	0.035	(0.071)	0.031	0.003
284	23.67	0.07	0.035	(0.071)	0.031	0.003
285	23.75	0.07	0.035	(0.071)	0.031	0.003

286	23.83	0.07	0.035	(0.071)	0.031	0.003
287	23.92	0.07	0.035	(0.071)	0.031	0.003
288	24.00	0.07	0.035	(0.071)	0.031	0.003

(Loss Rate Not Used)

Sum = 100.0

Sum = 25.4

Flood volume = Effective rainfall 2.11(In)

times area 4.9(Ac.)/[(In)/(Ft.)] = 0.9(Ac.Ft)

Total soil loss = 2.23(In)

Total soil loss = 0.911(Ac.Ft)

Total rainfall = 4.34(In)

Flood volume = 37611.0 Cubic Feet

Total soil loss = 39670.6 Cubic Feet

Peak flow rate of this hydrograph = 2.319(CFS)

+++++

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	0.01	Q				
0+10	0.0002	0.02	Q				
0+15	0.0003	0.02	Q				
0+20	0.0004	0.02	Q				
0+25	0.0006	0.02	Q				
0+30	0.0008	0.03	Q				
0+35	0.0010	0.03	Q				
0+40	0.0011	0.03	Q				
0+45	0.0013	0.03	Q				
0+50	0.0015	0.03	Q				
0+55	0.0018	0.03	Q				
1+ 0	0.0020	0.03	Q				
1+ 5	0.0022	0.03	Q				
1+10	0.0024	0.03	Q				
1+15	0.0026	0.03	Q				
1+20	0.0027	0.03	Q				
1+25	0.0029	0.03	Q				
1+30	0.0031	0.03	Q				
1+35	0.0033	0.03	Q				
1+40	0.0034	0.03	Q				
1+45	0.0036	0.03	Q				
1+50	0.0038	0.03	Q				
1+55	0.0041	0.03	Q				
2+ 0	0.0043	0.03	Q				
2+ 5	0.0045	0.03	Q				
2+10	0.0048	0.03	Q				
2+15	0.0050	0.03	Q				
2+20	0.0052	0.03	Q				
2+25	0.0055	0.03	Q				
2+30	0.0057	0.03	Q				
2+35	0.0060	0.04	Q				
2+40	0.0063	0.04	Q				

2+45	0.0066	0.04	Q				
2+50	0.0069	0.04	Q				
2+55	0.0072	0.04	Q				
3+ 0	0.0075	0.04	Q				
3+ 5	0.0077	0.04	Q				
3+10	0.0080	0.04	Q				
3+15	0.0083	0.04	Q				
3+20	0.0086	0.04	Q				
3+25	0.0089	0.04	Q				
3+30	0.0092	0.04	Q				
3+35	0.0095	0.04	Q				
3+40	0.0098	0.04	Q				
3+45	0.0101	0.04	Q				
3+50	0.0104	0.05	Q				
3+55	0.0108	0.05	Q				
4+ 0	0.0111	0.05	Q				
4+ 5	0.0115	0.05	Q				
4+10	0.0119	0.05	Q				
4+15	0.0122	0.05	Q				
4+20	0.0126	0.06	Q				
4+25	0.0130	0.06	Q				
4+30	0.0134	0.06	Q				
4+35	0.0138	0.06	Q				
4+40	0.0142	0.06	Q				
4+45	0.0147	0.06	Q				
4+50	0.0151	0.06	Q				
4+55	0.0156	0.07	Q				
5+ 0	0.0160	0.07	Q				
5+ 5	0.0165	0.06	Q				
5+10	0.0168	0.05	Q				
5+15	0.0172	0.05	Q				
5+20	0.0176	0.06	Q				
5+25	0.0180	0.06	Q				
5+30	0.0184	0.06	Q				
5+35	0.0188	0.06	Q				
5+40	0.0193	0.07	Q				
5+45	0.0198	0.07	Q				
5+50	0.0202	0.07	Q				
5+55	0.0207	0.07	Q				
6+ 0	0.0212	0.07	Q				
6+ 5	0.0217	0.07	QV				
6+10	0.0222	0.08	QV				
6+15	0.0227	0.08	QV				
6+20	0.0233	0.08	QV				
6+25	0.0238	0.08	QV				
6+30	0.0243	0.08	QV				
6+35	0.0249	0.08	QV				
6+40	0.0255	0.09	QV				
6+45	0.0261	0.09	QV				
6+50	0.0267	0.09	QV				
6+55	0.0273	0.09	QV				
7+ 0	0.0279	0.09	QV				
7+ 5	0.0284	0.09	QV				
7+10	0.0290	0.09	QV				
7+15	0.0296	0.09	QV				
7+20	0.0302	0.09	QV				

7+25	0.0309	0.09	QV				
7+30	0.0315	0.09	QV				
7+35	0.0325	0.14	QV				
7+40	0.0337	0.18	QV				
7+45	0.0350	0.19	QV				
7+50	0.0367	0.24	QV				
7+55	0.0386	0.28	IQ				
8+ 0	0.0405	0.29	IQ				
8+ 5	0.0431	0.38	IQ				
8+10	0.0462	0.45	IQV				
8+15	0.0495	0.47	IQV				
8+20	0.0527	0.47	IQV				
8+25	0.0560	0.48	IQV				
8+30	0.0593	0.48	IQV				
8+35	0.0630	0.53	IQ				
8+40	0.0669	0.57	IQV				
8+45	0.0709	0.58	IQV				
8+50	0.0752	0.63	IQV				
8+55	0.0797	0.66	IQV				
9+ 0	0.0844	0.67	IQV				
9+ 5	0.0897	0.77	IQV				
9+10	0.0955	0.84	IQV				
9+15	0.1014	0.86	IQV				
9+20	0.1076	0.91	IQV				
9+25	0.1141	0.94	IQ V				
9+30	0.1207	0.95	IQ V				
9+35	0.1276	1.00	IQV				
9+40	0.1347	1.04	IQ V				
9+45	0.1420	1.05	IQ V				
9+50	0.1496	1.10	IQ V				
9+55	0.1574	1.14	IQ V				
10+ 0	0.1653	1.15	IQ V				
10+ 5	0.1711	0.85	IQ V				
10+10	0.1753	0.61	IQ V				
10+15	0.1793	0.57	IQ V				
10+20	0.1831	0.56	IQ V				
10+25	0.1870	0.57	IQ V				
10+30	0.1910	0.57	IQ V				
10+35	0.1964	0.79	IQ V				
10+40	0.2031	0.97	IQ V				
10+45	0.2099	1.00	IQ V				
10+50	0.2169	1.01	IQ V				
10+55	0.2239	1.02	IQ V				
11+ 0	0.2309	1.02	IQ V				
11+ 5	0.2377	0.98	IQ V				
11+10	0.2442	0.95	IQ V				
11+15	0.2507	0.95	IQ V				
11+20	0.2573	0.95	IQ V				
11+25	0.2638	0.95	IQ V				
11+30	0.2704	0.95	IQ V				
11+35	0.2764	0.87	IQ V				
11+40	0.2819	0.80	IQ V				
11+45	0.2874	0.80	IQ V				
11+50	0.2932	0.84	IQ V				
11+55	0.2992	0.88	IQ V				
12+ 0	0.3053	0.89	IQ V				

12+ 5	0.3136	1.20		Q		V					
12+10	0.3235	1.44		Q		V					
12+15	0.3337	1.49		Q		V					
12+20	0.3444	1.55		Q		V					
12+25	0.3553	1.58		Q		V					
12+30	0.3663	1.59		Q		V					
12+35	0.3779	1.69		Q		V					
12+40	0.3900	1.76		Q		V					
12+45	0.4022	1.77		Q		V					
12+50	0.4147	1.82		Q		V					
12+55	0.4275	1.86		Q		V					
13+ 0	0.4404	1.87		Q		V					
13+ 5	0.4548	2.09		Q		V					
13+10	0.4704	2.27		Q		V					
13+15	0.4863	2.30		Q		V					
13+20	0.5022	2.31		Q		V					
13+25	0.5182	2.32		Q		V					
13+30	0.5342	2.32		Q		V					
13+35	0.5468	1.84		Q		V					
13+40	0.5569	1.47		Q		V					
13+45	0.5666	1.40		Q		V					
13+50	0.5762	1.39		Q		V					
13+55	0.5857	1.39		Q		V					
14+ 0	0.5953	1.39		Q		V					
14+ 5	0.6061	1.57		Q		V					
14+10	0.6179	1.71		Q		V					
14+15	0.6299	1.74		Q		V					
14+20	0.6416	1.70		Q		V					
14+25	0.6532	1.67		Q		V					
14+30	0.6647	1.67		Q		V					
14+35	0.6762	1.67		Q		V					
14+40	0.6877	1.67		Q		V					
14+45	0.6992	1.68		Q		V					
14+50	0.7105	1.64		Q		V					
14+55	0.7216	1.60		Q		V					
15+ 0	0.7326	1.60		Q		V					
15+ 5	0.7433	1.56		Q		V					
15+10	0.7538	1.53		Q		V					
15+15	0.7643	1.52		Q		V					
15+20	0.7745	1.48		Q		V					
15+25	0.7845	1.45		Q		V					
15+30	0.7945	1.45		Q		V					
15+35	0.8032	1.27		Q		V					
15+40	0.8111	1.14		Q		V					
15+45	0.8187	1.12		Q		V					
15+50	0.8264	1.11		Q		V					
15+55	0.8341	1.11		Q		V					
16+ 0	0.8418	1.12		Q		V					
16+ 5	0.8457	0.57		Q		V					
16+10	0.8466	0.13	Q								
16+15	0.8470	0.06	Q								
16+20	0.8472	0.03	Q								
16+25	0.8474	0.03	Q								
16+30	0.8477	0.03	Q								
16+35	0.8479	0.03	Q								
16+40	0.8481	0.03	Q								

16+45	0.8482	0.03	Q				V
16+50	0.8484	0.03	Q				V
16+55	0.8486	0.03	Q				V
17+ 0	0.8488	0.03	Q				V
17+ 5	0.8490	0.03	Q				V
17+10	0.8493	0.04	Q				V
17+15	0.8496	0.04	Q				V
17+20	0.8499	0.04	Q				V
17+25	0.8502	0.04	Q				V
17+30	0.8505	0.04	Q				V
17+35	0.8508	0.04	Q				V
17+40	0.8511	0.04	Q				V
17+45	0.8514	0.04	Q				V
17+50	0.8516	0.04	Q				V
17+55	0.8519	0.04	Q				V
18+ 0	0.8521	0.03	Q				V
18+ 5	0.8523	0.03	Q				V
18+10	0.8526	0.03	Q				V
18+15	0.8528	0.03	Q				V
18+20	0.8531	0.03	Q				V
18+25	0.8533	0.03	Q				V
18+30	0.8535	0.03	Q				V
18+35	0.8537	0.03	Q				V
18+40	0.8539	0.03	Q				V
18+45	0.8541	0.03	Q				V
18+50	0.8542	0.02	Q				V
18+55	0.8544	0.02	Q				V
19+ 0	0.8545	0.02	Q				V
19+ 5	0.8546	0.02	Q				V
19+10	0.8548	0.02	Q				V
19+15	0.8550	0.03	Q				V
19+20	0.8552	0.03	Q				V
19+25	0.8554	0.03	Q				V
19+30	0.8557	0.03	Q				V
19+35	0.8559	0.03	Q				V
19+40	0.8560	0.03	Q				V
19+45	0.8562	0.03	Q				V
19+50	0.8564	0.02	Q				V
19+55	0.8565	0.02	Q				V
20+ 0	0.8566	0.02	Q				V
20+ 5	0.8568	0.02	Q				V
20+10	0.8569	0.02	Q				V
20+15	0.8571	0.03	Q				V
20+20	0.8573	0.03	Q				V
20+25	0.8575	0.03	Q				V
20+30	0.8576	0.03	Q				V
20+35	0.8578	0.03	Q				V
20+40	0.8580	0.03	Q				V
20+45	0.8582	0.03	Q				V
20+50	0.8583	0.02	Q				V
20+55	0.8584	0.02	Q				V
21+ 0	0.8586	0.02	Q				V
21+ 5	0.8587	0.02	Q				V
21+10	0.8589	0.02	Q				V
21+15	0.8591	0.03	Q				V
21+20	0.8592	0.02	Q				V

21+25	0.8593	0.02	Q				V
21+30	0.8595	0.02	Q				V
21+35	0.8596	0.02	Q				V
21+40	0.8598	0.02	Q				V
21+45	0.8600	0.03	Q				V
21+50	0.8601	0.02	Q				V
21+55	0.8602	0.02	Q				V
22+ 0	0.8603	0.02	Q				V
22+ 5	0.8605	0.02	Q				V
22+10	0.8607	0.02	Q				V
22+15	0.8608	0.03	Q				V
22+20	0.8610	0.02	Q				V
22+25	0.8611	0.02	Q				V
22+30	0.8612	0.02	Q				V
22+35	0.8613	0.02	Q				V
22+40	0.8615	0.02	Q				V
22+45	0.8616	0.02	Q				V
22+50	0.8617	0.02	Q				V
22+55	0.8618	0.02	Q				V
23+ 0	0.8619	0.02	Q				V
23+ 5	0.8621	0.02	Q				V
23+10	0.8622	0.02	Q				V
23+15	0.8623	0.02	Q				V
23+20	0.8624	0.02	Q				V
23+25	0.8625	0.02	Q				V
23+30	0.8626	0.02	Q				V
23+35	0.8628	0.02	Q				V
23+40	0.8629	0.02	Q				V
23+45	0.8630	0.02	Q				V
23+50	0.8631	0.02	Q				V
23+55	0.8632	0.02	Q				V
24+ 0	0.8634	0.02	Q				V
24+ 5	0.8634	0.01	Q				V
24+10	0.8634	0.00	Q				V
24+15	0.8634	0.00	Q				V

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 09/05/25 File: prop10110.out

+++++

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

Program License Serial Number 6513

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

English Units used in output format

APN 915-330-040
Proposed Condition Unit Hydrograph
10-Year Design Storm
Area A-1 and A-4

Drainage Area = 1.89(Ac.) = 0.003 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 1.89(Ac.) =
0.003 Sq. Mi.
Length along longest watercourse = 706.00(Ft.)
Length along longest watercourse measured to centroid = 350.00(Ft.)
Length along longest watercourse = 0.134 Mi.
Length along longest watercourse measured to centroid = 0.066 Mi.
Difference in elevation = 17.40(Ft.)
Slope along watercourse = 130.1303 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.021 Hr.
Lag time = 1.23 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.49 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]
1.89	0.61	1.16

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
1.89	1.88	3.55

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.613 (In)
Area Averaged 100-Year Rainfall = 1.880 (In)

Point rain (area averaged) = 1.134 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.134 (In)

Sub-Area Data:

Area (Ac.)	Runoff Index	Impervious %
1.890	75.00	0.900
Total Area Entered = 1.89 (Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
75.0	75.0	0.303	0.900	0.058	1.000	0.058
Sum (F) =						0.058

Area averaged mean soil loss (F) (In/Hr) = 0.058
Minimum soil loss rate ((In/Hr)) = 0.029
(for 24 hour storm duration)
Soil loss rate (decimal) = 0.280

Slope of intensity-duration curve for a 1 hour storm = 0.5800

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	405.795	65.481
2	0.167	811.589	34.519
Sum =		100.000	Sum= 1.905

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	3.60	0.490 (0.137)	0.432
2	0.17	4.20	0.572 (0.160)	0.514
3	0.25	4.40	0.599 (0.168)	0.541
4	0.33	4.60	0.626 (0.175)	0.569
5	0.42	5.00	0.681 (0.191)	0.623

6	0.50	5.60	0.762	0.058	(0.213)	0.705
7	0.58	6.40	0.871	0.058	(0.244)	0.814
8	0.67	8.10	1.102	0.058	(0.309)	1.045
9	0.75	13.10	1.783	0.058	(0.499)	1.725
10	0.83	34.50	4.696	0.058	(1.315)	4.638
11	0.92	6.70	0.912	0.058	(0.255)	0.854
12	1.00	3.80	0.517	0.058	(0.145)	0.460

(Loss Rate Not Used)

Sum = 100.0

Sum = 12.9

Flood volume = Effective rainfall 1.08(In)

times area 1.9(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)

Total soil loss = 0.06(In)

Total soil loss = 0.009(Ac.Ft)

Total rainfall = 1.13(In)

Flood volume = 7386.7 Cubic Feet

Total soil loss = 395.0 Cubic Feet

Peak flow rate of this hydrograph = 6.923(CFS)

+++++

1 - 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	0.0037	0.54	V Q				
0+10	0.0101	0.93	VQ				
0+15	0.0171	1.01	Q				
0+20	0.0244	1.07	QV				
0+25	0.0323	1.15	Q V				
0+30	0.0412	1.29	Q V				
0+35	0.0514	1.48	Q	V			
0+40	0.0641	1.84	Q	V			
0+45	0.0836	2.84		Q	V		
0+50	0.1313	6.92			Q	V	
0+55	0.1597	4.12		Q		V	
1+ 0	0.1675	1.14	Q			V	
1+ 5	0.1696	0.30	Q			V	

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 09/05/25 File: prop10310.out

+++++

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

Program License Serial Number 6513

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

English Units used in output format

APN 915-330-040
Proposed Condition Unit Hydrograph
10-Year Design Storm
Area A-1 and A-4

Drainage Area = 1.89(Ac.) = 0.003 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 1.89(Ac.) =
0.003 Sq. Mi.
Length along longest watercourse = 706.00(Ft.)
Length along longest watercourse measured to centroid = 350.00(Ft.)
Length along longest watercourse = 0.134 Mi.
Length along longest watercourse measured to centroid = 0.066 Mi.
Difference in elevation = 17.40(Ft.)
Slope along watercourse = 130.1303 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.021 Hr.
Lag time = 1.23 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.49 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.) [1]	Rainfall(In) [2]	Weighting[1*2]
1.89	1.02	1.93

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
1.89	2.79	5.27

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.020 (In)
Area Averaged 100-Year Rainfall = 2.790 (In)

Point rain (area averaged) = 1.748 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.748 (In)

Sub-Area Data:

Area (Ac.)	Runoff Index	Impervious %
1.890	75.00	0.900
Total Area Entered = 1.89 (Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
75.0	75.0	0.303	0.900	0.058	1.000	0.058
Sum (F) =						0.058

Area averaged mean soil loss (F) (In/Hr) = 0.058
Minimum soil loss rate ((In/Hr)) = 0.029
(for 24 hour storm duration)
Soil loss rate (decimal) = 0.280

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	405.795	65.481	1.247
2 0.167	811.589	34.519	0.658
Sum = 100.000		Sum =	1.905

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	1.30	0.273	0.058 (0.076)	0.215
2 0.17	1.30	0.273	0.058 (0.076)	0.215
3 0.25	1.10	0.231	0.058 (0.065)	0.173
4 0.33	1.50	0.315	0.058 (0.088)	0.257
5 0.42	1.50	0.315	0.058 (0.088)	0.257
6 0.50	1.80	0.378	0.058 (0.106)	0.320
7 0.58	1.50	0.315	0.058 (0.088)	0.257

8	0.67	1.80	0.378	0.058	(0.106)	0.320
9	0.75	1.80	0.378	0.058	(0.106)	0.320
10	0.83	1.50	0.315	0.058	(0.088)	0.257
11	0.92	1.60	0.336	0.058	(0.094)	0.278
12	1.00	1.80	0.378	0.058	(0.106)	0.320
13	1.08	2.20	0.462	0.058	(0.129)	0.404
14	1.17	2.20	0.462	0.058	(0.129)	0.404
15	1.25	2.20	0.462	0.058	(0.129)	0.404
16	1.33	2.00	0.420	0.058	(0.117)	0.362
17	1.42	2.60	0.545	0.058	(0.153)	0.488
18	1.50	2.70	0.566	0.058	(0.159)	0.509
19	1.58	2.40	0.503	0.058	(0.141)	0.446
20	1.67	2.70	0.566	0.058	(0.159)	0.509
21	1.75	3.30	0.692	0.058	(0.194)	0.635
22	1.83	3.10	0.650	0.058	(0.182)	0.593
23	1.92	2.90	0.608	0.058	(0.170)	0.551
24	2.00	3.00	0.629	0.058	(0.176)	0.572
25	2.08	3.10	0.650	0.058	(0.182)	0.593
26	2.17	4.20	0.881	0.058	(0.247)	0.824
27	2.25	5.00	1.049	0.058	(0.294)	0.991
28	2.33	3.50	0.734	0.058	(0.206)	0.677
29	2.42	6.80	1.427	0.058	(0.399)	1.369
30	2.50	7.30	1.531	0.058	(0.429)	1.474
31	2.58	8.20	1.720	0.058	(0.482)	1.663
32	2.67	5.90	1.238	0.058	(0.347)	1.180
33	2.75	2.00	0.420	0.058	(0.117)	0.362
34	2.83	1.80	0.378	0.058	(0.106)	0.320
35	2.92	1.80	0.378	0.058	(0.106)	0.320
36	3.00	0.60	0.126	(0.058)	0.035	0.091

(Loss Rate Not Used)

Sum = 100.0

Sum = 18.9

Flood volume = Effective rainfall 1.58(In)

times area 1.9(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)

Total soil loss = 0.17(In)

Total soil loss = 0.027(Ac.Ft)

Total rainfall = 1.75(In)

Flood volume = 10821.6 Cubic Feet

Total soil loss = 1172.1 Cubic Feet

Peak flow rate of this hydrograph = 3.044(CFS)

+++++

3 - 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	0.0018	0.27	VQ				
0+10	0.0047	0.41	VQ				
0+15	0.0071	0.36	IQ				
0+20	0.0101	0.43	IQ				
0+25	0.0135	0.49	IQV				
0+30	0.0174	0.57	I Q				

0+35	0.0211	0.53	QV				
0+40	0.0250	0.57	Q V				
0+45	0.0292	0.61	Q V				
0+50	0.0329	0.53	Q V				
0+55	0.0364	0.52	Q V				
1+ 0	0.0404	0.58	Q V				
1+ 5	0.0453	0.71	Q V				
1+10	0.0506	0.77	Q V				
1+15	0.0559	0.77	Q V				
1+20	0.0609	0.72	Q V				
1+25	0.0667	0.85	Q V				
1+30	0.0733	0.96	Q V				
1+35	0.0794	0.89	Q V				
1+40	0.0858	0.93	Q V				
1+45	0.0936	1.13	Q V				
1+50	0.1016	1.16	Q V				
1+55	0.1090	1.08	Q V				
2+ 0	0.1164	1.08	Q V				
2+ 5	0.1241	1.12	Q V				
2+10	0.1338	1.42	Q V				
2+15	0.1461	1.78	Q V				
2+20	0.1564	1.50	Q V				
2+25	0.1712	2.15	Q V				
2+30	0.1901	2.74	Q V				
2+35	0.2111	3.04	Q V				
2+40	0.2287	2.57	Q V				
2+45	0.2372	1.23	Q V				
2+50	0.2416	0.64	Q V				
2+55	0.2458	0.61	Q V				
3+ 0	0.2480	0.32	Q V				
3+ 5	0.2484	0.06	Q V				

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 09/05/25 File: prop10610.out

+++++

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

Program License Serial Number 6513

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

English Units used in output format

APN 915-330-040
Proposed Condition Unit Hydrograph
10-Year Design Storm
Area A-1 and A-4

Drainage Area = 1.89(Ac.) = 0.003 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 1.89(Ac.) =
0.003 Sq. Mi.
Length along longest watercourse = 706.00(Ft.)
Length along longest watercourse measured to centroid = 350.00(Ft.)
Length along longest watercourse = 0.134 Mi.
Length along longest watercourse measured to centroid = 0.066 Mi.
Difference in elevation = 17.40(Ft.)
Slope along watercourse = 130.1303 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.021 Hr.
Lag time = 1.23 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.49 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]
1.89	1.42	2.68

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
1.89	2.79	5.27

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.420 (In)
Area Averaged 100-Year Rainfall = 2.790 (In)

Point rain (area averaged) = 1.984 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.984 (In)

Sub-Area Data:

Area (Ac.)	Runoff Index	Impervious %
1.890	75.00	0.900
Total Area Entered = 1.89 (Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
75.0	75.0	0.303	0.900	0.058	1.000	0.058
Sum (F) =						0.058

Area averaged mean soil loss (F) (In/Hr) = 0.058
Minimum soil loss rate ((In/Hr)) = 0.029
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.280

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	405.795	65.481	1.247
2 0.167	811.589	34.519	0.658
Sum = 100.000		Sum=	1.905

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	0.119	(0.058) 0.033	0.086
2 0.17	0.60	0.143	(0.058) 0.040	0.103
3 0.25	0.60	0.143	(0.058) 0.040	0.103
4 0.33	0.60	0.143	(0.058) 0.040	0.103
5 0.42	0.60	0.143	(0.058) 0.040	0.103
6 0.50	0.70	0.167	(0.058) 0.047	0.120
7 0.58	0.70	0.167	(0.058) 0.047	0.120

8	0.67	0.70	0.167	(0.058)	0.047	0.120
9	0.75	0.70	0.167	(0.058)	0.047	0.120
10	0.83	0.70	0.167	(0.058)	0.047	0.120
11	0.92	0.70	0.167	(0.058)	0.047	0.120
12	1.00	0.80	0.190	(0.058)	0.053	0.137
13	1.08	0.80	0.190	(0.058)	0.053	0.137
14	1.17	0.80	0.190	(0.058)	0.053	0.137
15	1.25	0.80	0.190	(0.058)	0.053	0.137
16	1.33	0.80	0.190	(0.058)	0.053	0.137
17	1.42	0.80	0.190	(0.058)	0.053	0.137
18	1.50	0.80	0.190	(0.058)	0.053	0.137
19	1.58	0.80	0.190	(0.058)	0.053	0.137
20	1.67	0.80	0.190	(0.058)	0.053	0.137
21	1.75	0.80	0.190	(0.058)	0.053	0.137
22	1.83	0.80	0.190	(0.058)	0.053	0.137
23	1.92	0.80	0.190	(0.058)	0.053	0.137
24	2.00	0.90	0.214	0.058	(0.060)	0.157
25	2.08	0.80	0.190	(0.058)	0.053	0.137
26	2.17	0.90	0.214	0.058	(0.060)	0.157
27	2.25	0.90	0.214	0.058	(0.060)	0.157
28	2.33	0.90	0.214	0.058	(0.060)	0.157
29	2.42	0.90	0.214	0.058	(0.060)	0.157
30	2.50	0.90	0.214	0.058	(0.060)	0.157
31	2.58	0.90	0.214	0.058	(0.060)	0.157
32	2.67	0.90	0.214	0.058	(0.060)	0.157
33	2.75	1.00	0.238	0.058	(0.067)	0.180
34	2.83	1.00	0.238	0.058	(0.067)	0.180
35	2.92	1.00	0.238	0.058	(0.067)	0.180
36	3.00	1.00	0.238	0.058	(0.067)	0.180
37	3.08	1.00	0.238	0.058	(0.067)	0.180
38	3.17	1.10	0.262	0.058	(0.073)	0.204
39	3.25	1.10	0.262	0.058	(0.073)	0.204
40	3.33	1.10	0.262	0.058	(0.073)	0.204
41	3.42	1.20	0.286	0.058	(0.080)	0.228
42	3.50	1.30	0.309	0.058	(0.087)	0.252
43	3.58	1.40	0.333	0.058	(0.093)	0.276
44	3.67	1.40	0.333	0.058	(0.093)	0.276
45	3.75	1.50	0.357	0.058	(0.100)	0.299
46	3.83	1.50	0.357	0.058	(0.100)	0.299
47	3.92	1.60	0.381	0.058	(0.107)	0.323
48	4.00	1.60	0.381	0.058	(0.107)	0.323
49	4.08	1.70	0.405	0.058	(0.113)	0.347
50	4.17	1.80	0.428	0.058	(0.120)	0.371
51	4.25	1.90	0.452	0.058	(0.127)	0.395
52	4.33	2.00	0.476	0.058	(0.133)	0.418
53	4.42	2.10	0.500	0.058	(0.140)	0.442
54	4.50	2.10	0.500	0.058	(0.140)	0.442
55	4.58	2.20	0.524	0.058	(0.147)	0.466
56	4.67	2.30	0.547	0.058	(0.153)	0.490
57	4.75	2.40	0.571	0.058	(0.160)	0.514
58	4.83	2.40	0.571	0.058	(0.160)	0.514
59	4.92	2.50	0.595	0.058	(0.167)	0.538
60	5.00	2.60	0.619	0.058	(0.173)	0.561
61	5.08	3.10	0.738	0.058	(0.207)	0.680
62	5.17	3.60	0.857	0.058	(0.240)	0.799
63	5.25	3.90	0.928	0.058	(0.260)	0.871

64	5.33	4.20	1.000	0.058	(0.280)	0.942
65	5.42	4.70	1.119	0.058	(0.313)	1.061
66	5.50	5.60	1.333	0.058	(0.373)	1.275
67	5.58	1.90	0.452	0.058	(0.127)	0.395
68	5.67	0.90	0.214	0.058	(0.060)	0.157
69	5.75	0.60	0.143	(0.058)	0.040	0.103
70	5.83	0.50	0.119	(0.058)	0.033	0.086
71	5.92	0.30	0.071	(0.058)	0.020	0.051
72	6.00	0.20	0.048	(0.058)	0.013	0.034

(Loss Rate Not Used)

Sum = 100.0

Sum = 20.0

Flood volume = Effective rainfall 1.67(In)

times area 1.9(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)

Total soil loss = 0.32(In)

Total soil loss = 0.050(Ac.Ft)

Total rainfall = 1.98(In)

Flood volume = 11433.0 Cubic Feet

Total soil loss = 2176.0 Cubic Feet

Peak flow rate of this hydrograph = 2.290(CFS)

+++++

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	0.0007	0.11	Q				
0+10	0.0020	0.18	Q				
0+15	0.0034	0.20	Q				
0+20	0.0047	0.20	Q				
0+25	0.0061	0.20	Q				
0+30	0.0076	0.22	QV				
0+35	0.0091	0.23	QV				
0+40	0.0107	0.23	QV				
0+45	0.0123	0.23	QV				
0+50	0.0139	0.23	Q V				
0+55	0.0154	0.23	Q V				
1+ 0	0.0171	0.25	QV				
1+ 5	0.0189	0.26	QV				
1+10	0.0207	0.26	Q V				
1+15	0.0225	0.26	Q V				
1+20	0.0243	0.26	Q V				
1+25	0.0261	0.26	Q V				
1+30	0.0279	0.26	Q V				
1+35	0.0297	0.26	Q V				
1+40	0.0315	0.26	Q V				
1+45	0.0333	0.26	Q V				
1+50	0.0351	0.26	Q V				
1+55	0.0369	0.26	Q V				
2+ 0	0.0389	0.29	Q V				
2+ 5	0.0408	0.27	Q V				
2+10	0.0428	0.29	Q V				

2+15	0.0448	0.30	Q	V				
2+20	0.0469	0.30	Q	V				
2+25	0.0489	0.30	Q	V				
2+30	0.0510	0.30	Q	V				
2+35	0.0530	0.30	Q	V				
2+40	0.0551	0.30	Q	V				
2+45	0.0574	0.33	Q	V				
2+50	0.0597	0.34	Q	V				
2+55	0.0621	0.34	Q	V				
3+ 0	0.0645	0.34	Q	V				
3+ 5	0.0668	0.34	Q	V				
3+10	0.0694	0.37	Q	V				
3+15	0.0721	0.39	Q	V				
3+20	0.0748	0.39	Q	V				
3+25	0.0777	0.42	Q	V				
3+30	0.0809	0.46	Q	V				
3+35	0.0844	0.51	Q	V				
3+40	0.0880	0.53	Q	V				
3+45	0.0918	0.56	Q	V				
3+50	0.0957	0.57	Q	V				
3+55	0.0999	0.60	Q	V				
4+ 0	0.1041	0.62	Q	V				
4+ 5	0.1086	0.65	Q	V				
4+10	0.1133	0.69	Q	V				
4+15	0.1184	0.74	Q	V				
4+20	0.1238	0.78	Q	V				
4+25	0.1295	0.83	Q	V				
4+30	0.1353	0.84	Q	V				
4+35	0.1413	0.87	Q	V				
4+40	0.1476	0.92	Q	V				
4+45	0.1543	0.96	Q	V				
4+50	0.1610	0.98	Q	V				
4+55	0.1679	1.01	Q	V				
5+ 0	0.1752	1.05	Q	V				
5+ 5	0.1836	1.22	Q	V				
5+10	0.1935	1.45	Q	V				
5+15	0.2046	1.61	Q	V				
5+20	0.2167	1.75	Q	V				
5+25	0.2301	1.94	Q	V				
5+30	0.2459	2.29	Q	V				
5+35	0.2550	1.33	Q	V				
5+40	0.2582	0.46	Q	V				
5+45	0.2597	0.23	Q	V				
5+50	0.2610	0.17	Q	V				
5+55	0.2618	0.12	Q	V				
6+ 0	0.2623	0.08	Q	V				
6+ 5	0.2625	0.02	Q	V				

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 09/05/25 File: prop102410.out

+++++

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

Program License Serial Number 6513

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

English Units used in output format

APN 915-330-040
Proposed Condition Unit Hydrograph
10-Year Design Storm
Area A-1 and A-4

Drainage Area = 1.89(Ac.) = 0.003 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 1.89(Ac.) =
0.003 Sq. Mi.
Length along longest watercourse = 706.00(Ft.)
Length along longest watercourse measured to centroid = 350.00(Ft.)
Length along longest watercourse = 0.134 Mi.
Length along longest watercourse measured to centroid = 0.066 Mi.
Difference in elevation = 17.40(Ft.)
Slope along watercourse = 130.1303 Ft./Mi.
Average Manning's 'N' = 0.013
Lag time = 0.021 Hr.
Lag time = 1.23 Min.
25% of lag time = 0.31 Min.
40% of lag time = 0.49 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]
1.89	2.51	4.74

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
1.89	6.97	13.17

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.510 (In)
Area Averaged 100-Year Rainfall = 6.970 (In)

Point rain (area averaged) = 4.345 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.345 (In)

Sub-Area Data:

Area (Ac.)	Runoff Index	Impervious %
1.890	75.00	0.900
Total Area Entered = 1.89 (Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
75.0	75.0	0.303	0.900	0.058	1.000	0.058
Sum (F) =						0.058

Area averaged mean soil loss (F) (In/Hr) = 0.058
Minimum soil loss rate ((In/Hr)) = 0.029
(for 24 hour storm duration)
Soil loss rate (decimal) = 0.280

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	405.795	65.481	1.247
2 0.167	811.589	34.519	0.658
Sum = 100.000		Sum =	1.905

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	0.07	0.035	(0.102) 0.010	0.025
2 0.17	0.07	0.035	(0.102) 0.010	0.025
3 0.25	0.07	0.035	(0.101) 0.010	0.025
4 0.33	0.10	0.052	(0.101) 0.015	0.038
5 0.42	0.10	0.052	(0.100) 0.015	0.038
6 0.50	0.10	0.052	(0.100) 0.015	0.038
7 0.58	0.10	0.052	(0.100) 0.015	0.038

8	0.67	0.10	0.052	(0.099)	0.015	0.038
9	0.75	0.10	0.052	(0.099)	0.015	0.038
10	0.83	0.13	0.070	(0.099)	0.019	0.050
11	0.92	0.13	0.070	(0.098)	0.019	0.050
12	1.00	0.13	0.070	(0.098)	0.019	0.050
13	1.08	0.10	0.052	(0.097)	0.015	0.038
14	1.17	0.10	0.052	(0.097)	0.015	0.038
15	1.25	0.10	0.052	(0.097)	0.015	0.038
16	1.33	0.10	0.052	(0.096)	0.015	0.038
17	1.42	0.10	0.052	(0.096)	0.015	0.038
18	1.50	0.10	0.052	(0.095)	0.015	0.038
19	1.58	0.10	0.052	(0.095)	0.015	0.038
20	1.67	0.10	0.052	(0.095)	0.015	0.038
21	1.75	0.10	0.052	(0.094)	0.015	0.038
22	1.83	0.13	0.070	(0.094)	0.019	0.050
23	1.92	0.13	0.070	(0.094)	0.019	0.050
24	2.00	0.13	0.070	(0.093)	0.019	0.050
25	2.08	0.13	0.070	(0.093)	0.019	0.050
26	2.17	0.13	0.070	(0.092)	0.019	0.050
27	2.25	0.13	0.070	(0.092)	0.019	0.050
28	2.33	0.13	0.070	(0.092)	0.019	0.050
29	2.42	0.13	0.070	(0.091)	0.019	0.050
30	2.50	0.13	0.070	(0.091)	0.019	0.050
31	2.58	0.17	0.087	(0.091)	0.024	0.063
32	2.67	0.17	0.087	(0.090)	0.024	0.063
33	2.75	0.17	0.087	(0.090)	0.024	0.063
34	2.83	0.17	0.087	(0.089)	0.024	0.063
35	2.92	0.17	0.087	(0.089)	0.024	0.063
36	3.00	0.17	0.087	(0.089)	0.024	0.063
37	3.08	0.17	0.087	(0.088)	0.024	0.063
38	3.17	0.17	0.087	(0.088)	0.024	0.063
39	3.25	0.17	0.087	(0.088)	0.024	0.063
40	3.33	0.17	0.087	(0.087)	0.024	0.063
41	3.42	0.17	0.087	(0.087)	0.024	0.063
42	3.50	0.17	0.087	(0.087)	0.024	0.063
43	3.58	0.17	0.087	(0.086)	0.024	0.063
44	3.67	0.17	0.087	(0.086)	0.024	0.063
45	3.75	0.17	0.087	(0.085)	0.024	0.063
46	3.83	0.20	0.104	(0.085)	0.029	0.075
47	3.92	0.20	0.104	(0.085)	0.029	0.075
48	4.00	0.20	0.104	(0.084)	0.029	0.075
49	4.08	0.20	0.104	(0.084)	0.029	0.075
50	4.17	0.20	0.104	(0.084)	0.029	0.075
51	4.25	0.20	0.104	(0.083)	0.029	0.075
52	4.33	0.23	0.122	(0.083)	0.034	0.088
53	4.42	0.23	0.122	(0.083)	0.034	0.088
54	4.50	0.23	0.122	(0.082)	0.034	0.088
55	4.58	0.23	0.122	(0.082)	0.034	0.088
56	4.67	0.23	0.122	(0.082)	0.034	0.088
57	4.75	0.23	0.122	(0.081)	0.034	0.088
58	4.83	0.27	0.139	(0.081)	0.039	0.100
59	4.92	0.27	0.139	(0.080)	0.039	0.100
60	5.00	0.27	0.139	(0.080)	0.039	0.100
61	5.08	0.20	0.104	(0.080)	0.029	0.075
62	5.17	0.20	0.104	(0.079)	0.029	0.075
63	5.25	0.20	0.104	(0.079)	0.029	0.075

64	5.33	0.23	0.122	(0.079)	0.034	0.088
65	5.42	0.23	0.122	(0.078)	0.034	0.088
66	5.50	0.23	0.122	(0.078)	0.034	0.088
67	5.58	0.27	0.139	(0.078)	0.039	0.100
68	5.67	0.27	0.139	(0.077)	0.039	0.100
69	5.75	0.27	0.139	(0.077)	0.039	0.100
70	5.83	0.27	0.139	(0.077)	0.039	0.100
71	5.92	0.27	0.139	(0.076)	0.039	0.100
72	6.00	0.27	0.139	(0.076)	0.039	0.100
73	6.08	0.30	0.156	(0.076)	0.044	0.113
74	6.17	0.30	0.156	(0.075)	0.044	0.113
75	6.25	0.30	0.156	(0.075)	0.044	0.113
76	6.33	0.30	0.156	(0.075)	0.044	0.113
77	6.42	0.30	0.156	(0.074)	0.044	0.113
78	6.50	0.30	0.156	(0.074)	0.044	0.113
79	6.58	0.33	0.174	(0.074)	0.049	0.125
80	6.67	0.33	0.174	(0.073)	0.049	0.125
81	6.75	0.33	0.174	(0.073)	0.049	0.125
82	6.83	0.33	0.174	(0.073)	0.049	0.125
83	6.92	0.33	0.174	(0.072)	0.049	0.125
84	7.00	0.33	0.174	(0.072)	0.049	0.125
85	7.08	0.33	0.174	(0.072)	0.049	0.125
86	7.17	0.33	0.174	(0.071)	0.049	0.125
87	7.25	0.33	0.174	(0.071)	0.049	0.125
88	7.33	0.37	0.191	(0.071)	0.054	0.138
89	7.42	0.37	0.191	(0.070)	0.054	0.138
90	7.50	0.37	0.191	(0.070)	0.054	0.138
91	7.58	0.40	0.209	(0.070)	0.058	0.150
92	7.67	0.40	0.209	(0.069)	0.058	0.150
93	7.75	0.40	0.209	(0.069)	0.058	0.150
94	7.83	0.43	0.226	(0.069)	0.063	0.163
95	7.92	0.43	0.226	(0.068)	0.063	0.163
96	8.00	0.43	0.226	(0.068)	0.063	0.163
97	8.08	0.50	0.261	0.068 (0.073)		0.193
98	8.17	0.50	0.261	0.067 (0.073)		0.193
99	8.25	0.50	0.261	0.067 (0.073)		0.194
100	8.33	0.50	0.261	0.067 (0.073)		0.194
101	8.42	0.50	0.261	0.067 (0.073)		0.194
102	8.50	0.50	0.261	0.066 (0.073)		0.194
103	8.58	0.53	0.278	0.066 (0.078)		0.212
104	8.67	0.53	0.278	0.066 (0.078)		0.212
105	8.75	0.53	0.278	0.065 (0.078)		0.213
106	8.83	0.57	0.295	0.065 (0.083)		0.230
107	8.92	0.57	0.295	0.065 (0.083)		0.231
108	9.00	0.57	0.295	0.064 (0.083)		0.231
109	9.08	0.63	0.330	0.064 (0.092)		0.266
110	9.17	0.63	0.330	0.064 (0.092)		0.266
111	9.25	0.63	0.330	0.063 (0.092)		0.267
112	9.33	0.67	0.348	0.063 (0.097)		0.284
113	9.42	0.67	0.348	0.063 (0.097)		0.285
114	9.50	0.67	0.348	0.063 (0.097)		0.285
115	9.58	0.70	0.365	0.062 (0.102)		0.303
116	9.67	0.70	0.365	0.062 (0.102)		0.303
117	9.75	0.70	0.365	0.062 (0.102)		0.303
118	9.83	0.73	0.382	0.061 (0.107)		0.321
119	9.92	0.73	0.382	0.061 (0.107)		0.321

120	10.00	0.73	0.382	0.061	(0.107)	0.322
121	10.08	0.50	0.261	0.060	(0.073)	0.200
122	10.17	0.50	0.261	0.060	(0.073)	0.200
123	10.25	0.50	0.261	0.060	(0.073)	0.201
124	10.33	0.50	0.261	0.060	(0.073)	0.201
125	10.42	0.50	0.261	0.059	(0.073)	0.201
126	10.50	0.50	0.261	0.059	(0.073)	0.202
127	10.58	0.67	0.348	0.059	(0.097)	0.289
128	10.67	0.67	0.348	0.058	(0.097)	0.289
129	10.75	0.67	0.348	0.058	(0.097)	0.289
130	10.83	0.67	0.348	0.058	(0.097)	0.290
131	10.92	0.67	0.348	0.058	(0.097)	0.290
132	11.00	0.67	0.348	0.057	(0.097)	0.290
133	11.08	0.63	0.330	0.057	(0.092)	0.273
134	11.17	0.63	0.330	0.057	(0.092)	0.273
135	11.25	0.63	0.330	0.056	(0.092)	0.274
136	11.33	0.63	0.330	0.056	(0.092)	0.274
137	11.42	0.63	0.330	0.056	(0.092)	0.274
138	11.50	0.63	0.330	0.056	(0.092)	0.275
139	11.58	0.57	0.295	0.055	(0.083)	0.240
140	11.67	0.57	0.295	0.055	(0.083)	0.240
141	11.75	0.57	0.295	0.055	(0.083)	0.241
142	11.83	0.60	0.313	0.055	(0.088)	0.258
143	11.92	0.60	0.313	0.054	(0.088)	0.259
144	12.00	0.60	0.313	0.054	(0.088)	0.259
145	12.08	0.83	0.434	0.054	(0.122)	0.381
146	12.17	0.83	0.434	0.053	(0.122)	0.381
147	12.25	0.83	0.434	0.053	(0.122)	0.381
148	12.33	0.87	0.452	0.053	(0.127)	0.399
149	12.42	0.87	0.452	0.053	(0.127)	0.399
150	12.50	0.87	0.452	0.052	(0.127)	0.399
151	12.58	0.93	0.487	0.052	(0.136)	0.434
152	12.67	0.93	0.487	0.052	(0.136)	0.435
153	12.75	0.93	0.487	0.052	(0.136)	0.435
154	12.83	0.97	0.504	0.051	(0.141)	0.453
155	12.92	0.97	0.504	0.051	(0.141)	0.453
156	13.00	0.97	0.504	0.051	(0.141)	0.453
157	13.08	1.13	0.591	0.051	(0.165)	0.540
158	13.17	1.13	0.591	0.050	(0.165)	0.541
159	13.25	1.13	0.591	0.050	(0.165)	0.541
160	13.33	1.13	0.591	0.050	(0.165)	0.541
161	13.42	1.13	0.591	0.050	(0.165)	0.541
162	13.50	1.13	0.591	0.049	(0.165)	0.542
163	13.58	0.77	0.400	0.049	(0.112)	0.351
164	13.67	0.77	0.400	0.049	(0.112)	0.351
165	13.75	0.77	0.400	0.049	(0.112)	0.351
166	13.83	0.77	0.400	0.048	(0.112)	0.351
167	13.92	0.77	0.400	0.048	(0.112)	0.352
168	14.00	0.77	0.400	0.048	(0.112)	0.352
169	14.08	0.90	0.469	0.048	(0.131)	0.422
170	14.17	0.90	0.469	0.047	(0.131)	0.422
171	14.25	0.90	0.469	0.047	(0.131)	0.422
172	14.33	0.87	0.452	0.047	(0.127)	0.405
173	14.42	0.87	0.452	0.047	(0.127)	0.405
174	14.50	0.87	0.452	0.046	(0.127)	0.405
175	14.58	0.87	0.452	0.046	(0.127)	0.406

176	14.67	0.87	0.452	0.046	(0.127)	0.406
177	14.75	0.87	0.452	0.046	(0.127)	0.406
178	14.83	0.83	0.434	0.045	(0.122)	0.389
179	14.92	0.83	0.434	0.045	(0.122)	0.389
180	15.00	0.83	0.434	0.045	(0.122)	0.390
181	15.08	0.80	0.417	0.045	(0.117)	0.372
182	15.17	0.80	0.417	0.045	(0.117)	0.373
183	15.25	0.80	0.417	0.044	(0.117)	0.373
184	15.33	0.77	0.400	0.044	(0.112)	0.356
185	15.42	0.77	0.400	0.044	(0.112)	0.356
186	15.50	0.77	0.400	0.044	(0.112)	0.356
187	15.58	0.63	0.330	0.043	(0.092)	0.287
188	15.67	0.63	0.330	0.043	(0.092)	0.287
189	15.75	0.63	0.330	0.043	(0.092)	0.287
190	15.83	0.63	0.330	0.043	(0.092)	0.287
191	15.92	0.63	0.330	0.042	(0.092)	0.288
192	16.00	0.63	0.330	0.042	(0.092)	0.288
193	16.08	0.13	0.070	(0.042)	0.019	0.050
194	16.17	0.13	0.070	(0.042)	0.019	0.050
195	16.25	0.13	0.070	(0.042)	0.019	0.050
196	16.33	0.13	0.070	(0.041)	0.019	0.050
197	16.42	0.13	0.070	(0.041)	0.019	0.050
198	16.50	0.13	0.070	(0.041)	0.019	0.050
199	16.58	0.10	0.052	(0.041)	0.015	0.038
200	16.67	0.10	0.052	(0.041)	0.015	0.038
201	16.75	0.10	0.052	(0.040)	0.015	0.038
202	16.83	0.10	0.052	(0.040)	0.015	0.038
203	16.92	0.10	0.052	(0.040)	0.015	0.038
204	17.00	0.10	0.052	(0.040)	0.015	0.038
205	17.08	0.17	0.087	(0.040)	0.024	0.063
206	17.17	0.17	0.087	(0.039)	0.024	0.063
207	17.25	0.17	0.087	(0.039)	0.024	0.063
208	17.33	0.17	0.087	(0.039)	0.024	0.063
209	17.42	0.17	0.087	(0.039)	0.024	0.063
210	17.50	0.17	0.087	(0.039)	0.024	0.063
211	17.58	0.17	0.087	(0.038)	0.024	0.063
212	17.67	0.17	0.087	(0.038)	0.024	0.063
213	17.75	0.17	0.087	(0.038)	0.024	0.063
214	17.83	0.13	0.070	(0.038)	0.019	0.050
215	17.92	0.13	0.070	(0.038)	0.019	0.050
216	18.00	0.13	0.070	(0.037)	0.019	0.050
217	18.08	0.13	0.070	(0.037)	0.019	0.050
218	18.17	0.13	0.070	(0.037)	0.019	0.050
219	18.25	0.13	0.070	(0.037)	0.019	0.050
220	18.33	0.13	0.070	(0.037)	0.019	0.050
221	18.42	0.13	0.070	(0.037)	0.019	0.050
222	18.50	0.13	0.070	(0.036)	0.019	0.050
223	18.58	0.10	0.052	(0.036)	0.015	0.038
224	18.67	0.10	0.052	(0.036)	0.015	0.038
225	18.75	0.10	0.052	(0.036)	0.015	0.038
226	18.83	0.07	0.035	(0.036)	0.010	0.025
227	18.92	0.07	0.035	(0.035)	0.010	0.025
228	19.00	0.07	0.035	(0.035)	0.010	0.025
229	19.08	0.10	0.052	(0.035)	0.015	0.038
230	19.17	0.10	0.052	(0.035)	0.015	0.038
231	19.25	0.10	0.052	(0.035)	0.015	0.038

232	19.33	0.13	0.070	(0.035)	0.019	0.050
233	19.42	0.13	0.070	(0.035)	0.019	0.050
234	19.50	0.13	0.070	(0.034)	0.019	0.050
235	19.58	0.10	0.052	(0.034)	0.015	0.038
236	19.67	0.10	0.052	(0.034)	0.015	0.038
237	19.75	0.10	0.052	(0.034)	0.015	0.038
238	19.83	0.07	0.035	(0.034)	0.010	0.025
239	19.92	0.07	0.035	(0.034)	0.010	0.025
240	20.00	0.07	0.035	(0.033)	0.010	0.025
241	20.08	0.10	0.052	(0.033)	0.015	0.038
242	20.17	0.10	0.052	(0.033)	0.015	0.038
243	20.25	0.10	0.052	(0.033)	0.015	0.038
244	20.33	0.10	0.052	(0.033)	0.015	0.038
245	20.42	0.10	0.052	(0.033)	0.015	0.038
246	20.50	0.10	0.052	(0.033)	0.015	0.038
247	20.58	0.10	0.052	(0.032)	0.015	0.038
248	20.67	0.10	0.052	(0.032)	0.015	0.038
249	20.75	0.10	0.052	(0.032)	0.015	0.038
250	20.83	0.07	0.035	(0.032)	0.010	0.025
251	20.92	0.07	0.035	(0.032)	0.010	0.025
252	21.00	0.07	0.035	(0.032)	0.010	0.025
253	21.08	0.10	0.052	(0.032)	0.015	0.038
254	21.17	0.10	0.052	(0.032)	0.015	0.038
255	21.25	0.10	0.052	(0.031)	0.015	0.038
256	21.33	0.07	0.035	(0.031)	0.010	0.025
257	21.42	0.07	0.035	(0.031)	0.010	0.025
258	21.50	0.07	0.035	(0.031)	0.010	0.025
259	21.58	0.10	0.052	(0.031)	0.015	0.038
260	21.67	0.10	0.052	(0.031)	0.015	0.038
261	21.75	0.10	0.052	(0.031)	0.015	0.038
262	21.83	0.07	0.035	(0.031)	0.010	0.025
263	21.92	0.07	0.035	(0.030)	0.010	0.025
264	22.00	0.07	0.035	(0.030)	0.010	0.025
265	22.08	0.10	0.052	(0.030)	0.015	0.038
266	22.17	0.10	0.052	(0.030)	0.015	0.038
267	22.25	0.10	0.052	(0.030)	0.015	0.038
268	22.33	0.07	0.035	(0.030)	0.010	0.025
269	22.42	0.07	0.035	(0.030)	0.010	0.025
270	22.50	0.07	0.035	(0.030)	0.010	0.025
271	22.58	0.07	0.035	(0.030)	0.010	0.025
272	22.67	0.07	0.035	(0.030)	0.010	0.025
273	22.75	0.07	0.035	(0.030)	0.010	0.025
274	22.83	0.07	0.035	(0.029)	0.010	0.025
275	22.92	0.07	0.035	(0.029)	0.010	0.025
276	23.00	0.07	0.035	(0.029)	0.010	0.025
277	23.08	0.07	0.035	(0.029)	0.010	0.025
278	23.17	0.07	0.035	(0.029)	0.010	0.025
279	23.25	0.07	0.035	(0.029)	0.010	0.025
280	23.33	0.07	0.035	(0.029)	0.010	0.025
281	23.42	0.07	0.035	(0.029)	0.010	0.025
282	23.50	0.07	0.035	(0.029)	0.010	0.025
283	23.58	0.07	0.035	(0.029)	0.010	0.025
284	23.67	0.07	0.035	(0.029)	0.010	0.025
285	23.75	0.07	0.035	(0.029)	0.010	0.025
286	23.83	0.07	0.035	(0.029)	0.010	0.025
287	23.92	0.07	0.035	(0.029)	0.010	0.025

288 24.00 0.07 0.035 (0.029) 0.010 0.025

(Loss Rate Not Used)

Sum = 100.0

Sum = 42.5

Flood volume = Effective rainfall 3.54(In)

times area 1.9(Ac.)/[(In)/(Ft.)] = 0.6(Ac.Ft)

Total soil loss = 0.80(In)

Total soil loss = 0.126(Ac.Ft)

Total rainfall = 4.34(In)

Flood volume = 24317.7 Cubic Feet

Total soil loss = 5491.1 Cubic Feet

Peak flow rate of this hydrograph = 1.032(CFS)

+++++

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	0.0005	0.05	Q				
0+15	0.0009	0.05	Q				
0+20	0.0013	0.06	Q				
0+25	0.0018	0.07	Q				
0+30	0.0023	0.07	Q				
0+35	0.0028	0.07	Q				
0+40	0.0033	0.07	Q				
0+45	0.0038	0.07	Q				
0+50	0.0044	0.09	Q				
0+55	0.0050	0.10	Q				
1+ 0	0.0057	0.10	Q				
1+ 5	0.0062	0.08	Q				
1+10	0.0067	0.07	Q				
1+15	0.0072	0.07	Q				
1+20	0.0077	0.07	Q				
1+25	0.0082	0.07	Q				
1+30	0.0087	0.07	Q				
1+35	0.0092	0.07	Q				
1+40	0.0097	0.07	Q				
1+45	0.0102	0.07	Q				
1+50	0.0108	0.09	Q				
1+55	0.0114	0.10	Q				
2+ 0	0.0121	0.10	Q				
2+ 5	0.0127	0.10	Q				
2+10	0.0134	0.10	Q				
2+15	0.0141	0.10	QV				
2+20	0.0147	0.10	QV				
2+25	0.0154	0.10	QV				
2+30	0.0160	0.10	QV				
2+35	0.0168	0.11	QV				
2+40	0.0176	0.12	QV				
2+45	0.0184	0.12	QV				
2+50	0.0193	0.12	QV				

2+55	0.0201	0.12	QV				
3+ 0	0.0209	0.12	QV				
3+ 5	0.0217	0.12	QV				
3+10	0.0225	0.12	QV				
3+15	0.0234	0.12	QV				
3+20	0.0242	0.12	QV				
3+25	0.0250	0.12	QV				
3+30	0.0258	0.12	QV				
3+35	0.0267	0.12	QV				
3+40	0.0275	0.12	QV				
3+45	0.0283	0.12	Q V				
3+50	0.0292	0.13	Q V				
3+55	0.0302	0.14	Q V				
4+ 0	0.0312	0.14	Q V				
4+ 5	0.0322	0.14	Q V				
4+10	0.0332	0.14	Q V				
4+15	0.0341	0.14	Q V				
4+20	0.0352	0.16	Q V				
4+25	0.0364	0.17	Q V				
4+30	0.0375	0.17	Q V				
4+35	0.0387	0.17	Q V				
4+40	0.0398	0.17	Q V				
4+45	0.0410	0.17	Q V				
4+50	0.0422	0.18	Q V				
4+55	0.0436	0.19	Q V				
5+ 0	0.0449	0.19	Q V				
5+ 5	0.0460	0.16	Q V				
5+10	0.0470	0.14	Q V				
5+15	0.0479	0.14	Q V				
5+20	0.0490	0.16	Q V				
5+25	0.0502	0.17	Q V				
5+30	0.0513	0.17	Q V				
5+35	0.0526	0.18	Q V				
5+40	0.0539	0.19	Q V				
5+45	0.0552	0.19	Q V				
5+50	0.0565	0.19	Q V				
5+55	0.0579	0.19	Q V				
6+ 0	0.0592	0.19	Q V				
6+ 5	0.0606	0.21	Q V				
6+10	0.0621	0.21	Q V				
6+15	0.0635	0.21	Q V				
6+20	0.0650	0.21	Q V				
6+25	0.0665	0.21	Q V				
6+30	0.0680	0.21	Q V				
6+35	0.0696	0.23	Q V				
6+40	0.0712	0.24	Q V				
6+45	0.0728	0.24	Q V				
6+50	0.0745	0.24	Q V				
6+55	0.0761	0.24	Q V				
7+ 0	0.0778	0.24	Q V				
7+ 5	0.0794	0.24	Q V				
7+10	0.0811	0.24	Q V				
7+15	0.0827	0.24	Q V				
7+20	0.0845	0.25	IQ V				
7+25	0.0863	0.26	IQ V				
7+30	0.0881	0.26	IQ V				

7+35	0.0900	0.28	Q	V				
7+40	0.0919	0.29	Q	V				
7+45	0.0939	0.29	Q	V				
7+50	0.0960	0.30	Q	V				
7+55	0.0981	0.31	Q	V				
8+ 0	0.1003	0.31	Q	V				
8+ 5	0.1027	0.35	Q	V				
8+10	0.1052	0.37	Q	V				
8+15	0.1077	0.37	Q	V				
8+20	0.1103	0.37	Q	V				
8+25	0.1128	0.37	Q	V				
8+30	0.1154	0.37	Q	V				
8+35	0.1181	0.39	Q	V				
8+40	0.1209	0.40	Q	V				
8+45	0.1237	0.41	Q	V				
8+50	0.1266	0.43	Q	V				
8+55	0.1296	0.44	Q	V				
9+ 0	0.1327	0.44	Q	V				
9+ 5	0.1360	0.48	Q	V				
9+10	0.1395	0.51	Q	V				
9+15	0.1430	0.51	Q	V				
9+20	0.1466	0.53	Q	V				
9+25	0.1504	0.54	Q	V				
9+30	0.1541	0.54	Q	V				
9+35	0.1580	0.57	Q	V				
9+40	0.1620	0.58	Q	V				
9+45	0.1660	0.58	Q	V				
9+50	0.1701	0.60	Q	V				
9+55	0.1743	0.61	Q	V				
10+ 0	0.1785	0.61	Q	V				
10+ 5	0.1817	0.46	Q	V				
10+10	0.1843	0.38	Q	V				
10+15	0.1870	0.38	Q	V				
10+20	0.1896	0.38	Q	V				
10+25	0.1923	0.38	Q	V				
10+30	0.1949	0.38	Q	V				
10+35	0.1983	0.49	Q	V				
10+40	0.2021	0.55	Q	V				
10+45	0.2059	0.55	Q	V				
10+50	0.2097	0.55	Q	V				
10+55	0.2135	0.55	Q	V				
11+ 0	0.2173	0.55	Q	V				
11+ 5	0.2210	0.53	Q	V				
11+10	0.2245	0.52	Q	V				
11+15	0.2281	0.52	Q	V				
11+20	0.2317	0.52	Q	V				
11+25	0.2353	0.52	Q	V				
11+30	0.2389	0.52	Q	V				
11+35	0.2422	0.48	Q	V				
11+40	0.2454	0.46	Q	V				
11+45	0.2486	0.46	Q	V				
11+50	0.2519	0.48	Q	V				
11+55	0.2553	0.49	Q	V				
12+ 0	0.2586	0.49	Q	V				
12+ 5	0.2631	0.65	Q	V				
12+10	0.2681	0.73	Q	V				

12+15	0.2731	0.73	Q		V		
12+20	0.2783	0.75	Q		V		
12+25	0.2835	0.76	Q		V		
12+30	0.2887	0.76	Q		V		
12+35	0.2943	0.80	Q		V		
12+40	0.3000	0.83	Q		V		
12+45	0.3057	0.83	Q		V		
12+50	0.3116	0.85	Q		V		
12+55	0.3175	0.86	Q		V		
13+ 0	0.3234	0.86	Q		V		
13+ 5	0.3301	0.97	Q		V		
13+10	0.3372	1.03	Q		V		
13+15	0.3443	1.03	Q		V		
13+20	0.3514	1.03	Q		V		
13+25	0.3585	1.03	Q		V		
13+30	0.3656	1.03	Q		V		
13+35	0.3711	0.79	Q		V		
13+40	0.3757	0.67	Q		V		
13+45	0.3803	0.67	Q		V		
13+50	0.3849	0.67	Q		V		
13+55	0.3895	0.67	Q		V		
14+ 0	0.3942	0.67	Q		V		
14+ 5	0.3994	0.76	Q		V		
14+10	0.4049	0.80	Q		V		
14+15	0.4105	0.80	Q		V		
14+20	0.4159	0.78	Q		V		
14+25	0.4212	0.77	Q		V		
14+30	0.4265	0.77	Q		V		
14+35	0.4318	0.77	Q		V		
14+40	0.4371	0.77	Q		V		
14+45	0.4425	0.77	Q		V		
14+50	0.4477	0.75	Q		V		
14+55	0.4528	0.74	Q		V		
15+ 0	0.4579	0.74	Q		V		
15+ 5	0.4628	0.72	Q		V		
15+10	0.4677	0.71	Q		V		
15+15	0.4726	0.71	Q		V		
15+20	0.4774	0.69	Q		V		
15+25	0.4820	0.68	Q		V		
15+30	0.4867	0.68	Q		V		
15+35	0.4908	0.59	Q		V		
15+40	0.4946	0.55	Q		V		
15+45	0.4983	0.55	Q		V		
15+50	0.5021	0.55	Q		V		
15+55	0.5059	0.55	Q		V		
16+ 0	0.5097	0.55	Q		V		
16+ 5	0.5114	0.25	Q		V		
16+10	0.5120	0.10	Q		V		
16+15	0.5127	0.10	Q		V		
16+20	0.5134	0.10	Q		V		
16+25	0.5140	0.10	Q		V		
16+30	0.5147	0.10	Q		V		
16+35	0.5152	0.08	Q		V		
16+40	0.5157	0.07	Q		V		
16+45	0.5162	0.07	Q		V		
16+50	0.5167	0.07	Q		V		

16+55	0.5172	0.07	Q				V	
17+ 0	0.5177	0.07	Q				V	
17+ 5	0.5184	0.10	Q				V	
17+10	0.5192	0.12	Q				V	
17+15	0.5200	0.12	Q				V	
17+20	0.5209	0.12	Q				V	
17+25	0.5217	0.12	Q				V	
17+30	0.5225	0.12	Q				V	
17+35	0.5233	0.12	Q				V	
17+40	0.5241	0.12	Q				V	
17+45	0.5250	0.12	Q				V	
17+50	0.5257	0.10	Q				V	
17+55	0.5263	0.10	Q				V	
18+ 0	0.5270	0.10	Q				V	
18+ 5	0.5276	0.10	Q				V	
18+10	0.5283	0.10	Q				V	
18+15	0.5290	0.10	Q				V	
18+20	0.5296	0.10	Q				V	
18+25	0.5303	0.10	Q				V	
18+30	0.5309	0.10	Q				V	
18+35	0.5315	0.08	Q				V	
18+40	0.5320	0.07	Q				V	
18+45	0.5325	0.07	Q				V	
18+50	0.5329	0.06	Q				V	
18+55	0.5332	0.05	Q				V	
19+ 0	0.5335	0.05	Q				V	
19+ 5	0.5339	0.06	Q				V	
19+10	0.5344	0.07	Q				V	
19+15	0.5349	0.07	Q				V	
19+20	0.5355	0.09	Q				V	
19+25	0.5362	0.10	Q				V	
19+30	0.5368	0.10	Q				V	
19+35	0.5374	0.08	Q				V	
19+40	0.5379	0.07	Q				V	
19+45	0.5384	0.07	Q				V	
19+50	0.5388	0.06	Q				V	
19+55	0.5391	0.05	Q				V	
20+ 0	0.5394	0.05	Q				V	
20+ 5	0.5399	0.06	Q				V	
20+10	0.5404	0.07	Q				V	
20+15	0.5408	0.07	Q				V	
20+20	0.5413	0.07	Q				V	
20+25	0.5418	0.07	Q				V	
20+30	0.5423	0.07	Q				V	
20+35	0.5428	0.07	Q				V	
20+40	0.5433	0.07	Q				V	
20+45	0.5438	0.07	Q				V	
20+50	0.5442	0.06	Q				V	
20+55	0.5445	0.05	Q				V	
21+ 0	0.5448	0.05	Q				V	
21+ 5	0.5453	0.06	Q				V	
21+10	0.5458	0.07	Q				V	
21+15	0.5463	0.07	Q				V	
21+20	0.5466	0.06	Q				V	
21+25	0.5470	0.05	Q				V	
21+30	0.5473	0.05	Q				V	

21+35	0.5477	0.06	Q				V
21+40	0.5482	0.07	Q				V
21+45	0.5487	0.07	Q				V
21+50	0.5491	0.06	Q				V
21+55	0.5494	0.05	Q				V
22+ 0	0.5498	0.05	Q				V
22+ 5	0.5502	0.06	Q				V
22+10	0.5507	0.07	Q				V
22+15	0.5512	0.07	Q				V
22+20	0.5516	0.06	Q				V
22+25	0.5519	0.05	Q				V
22+30	0.5522	0.05	Q				V
22+35	0.5526	0.05	Q				V
22+40	0.5529	0.05	Q				V
22+45	0.5532	0.05	Q				V
22+50	0.5535	0.05	Q				V
22+55	0.5539	0.05	Q				V
23+ 0	0.5542	0.05	Q				V
23+ 5	0.5545	0.05	Q				V
23+10	0.5549	0.05	Q				V
23+15	0.5552	0.05	Q				V
23+20	0.5555	0.05	Q				V
23+25	0.5558	0.05	Q				V
23+30	0.5562	0.05	Q				V
23+35	0.5565	0.05	Q				V
23+40	0.5568	0.05	Q				V
23+45	0.5572	0.05	Q				V
23+50	0.5575	0.05	Q				V
23+55	0.5578	0.05	Q				V
24+ 0	0.5581	0.05	Q				V
24+ 5	0.5583	0.02	Q				V

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 09/05/25 File: outprop10110.out

+++++

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

Program License Serial Number 6513

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

English Units used in output format

APN 915-330-040
Proposed Condition Unit Hydrograph
10-Year Design Storm
Area A-2 & A-3

Drainage Area = 3.01 (Ac.) = 0.005 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 3.01 (Ac.) =
0.005 Sq. Mi.
Length along longest watercourse = 440.00 (Ft.)
Length along longest watercourse measured to centroid = 220.00 (Ft.)
Length along longest watercourse = 0.083 Mi.
Length along longest watercourse measured to centroid = 0.042 Mi.
Difference in elevation = 35.50 (Ft.)
Slope along watercourse = 426.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.026 Hr.
Lag time = 1.59 Min.
25% of lag time = 0.40 Min.
40% of lag time = 0.64 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]
3.01	0.61	1.85

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
3.01	1.88	5.66

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.613 (In)
Area Averaged 100-Year Rainfall = 1.880 (In)

Point rain (area averaged) = 1.134 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.134 (In)

Sub-Area Data:

Area (Ac.)	Runoff Index	Impervious %
3.010	89.00	0.000
Total Area Entered = 3.01 (Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
89.0	89.0	0.141	0.000	0.141	1.000	0.141
Sum (F) =						0.141

Area averaged mean soil loss (F) (In/Hr) = 0.141
Minimum soil loss rate ((In/Hr)) = 0.071
(for 24 hour storm duration)
Soil loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm = 0.5800

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	314.516	58.123	1.763
2 0.167	629.033	36.344	1.103
3 0.250	943.549	5.533	0.168
Sum = 100.000		Sum=	3.034

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	3.60	0.490	0.141 (0.441)	0.349
2 0.17	4.20	0.572	0.141 (0.514)	0.430
3 0.25	4.40	0.599	0.141 (0.539)	0.457
4 0.33	4.60	0.626	0.141 (0.563)	0.485

5	0.42	5.00	0.681	0.141	(0.612)	0.539
6	0.50	5.60	0.762	0.141	(0.686)	0.621
7	0.58	6.40	0.871	0.141	(0.784)	0.730
8	0.67	8.10	1.102	0.141	(0.992)	0.961
9	0.75	13.10	1.783	0.141	(1.605)	1.642
10	0.83	34.50	4.696	0.141	(4.226)	4.554
11	0.92	6.70	0.912	0.141	(0.821)	0.771
12	1.00	3.80	0.517	0.141	(0.465)	0.376

(Loss Rate Not Used)

Sum = 100.0

Sum = 11.9

Flood volume = Effective rainfall 0.99(In)

times area 3.0(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)

Total soil loss = 0.14(In)

Total soil loss = 0.035(Ac.Ft)

Total rainfall = 1.13(In)

Flood volume = 10847.9 Cubic Feet

Total soil loss = 1545.0 Cubic Feet

Peak flow rate of this hydrograph = 10.006(CFS)

+++++

1 - 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	0.0042	0.61	VQ				
0+10	0.0121	1.14	VQ				
0+15	0.0213	1.34	QV				
0+20	0.0312	1.43	Q V				
0+25	0.0420	1.56	Q V				
0+30	0.0542	1.77	Q V				
0+35	0.0684	2.06	Q V				
0+40	0.0863	2.60	Q V				
0+45	0.1144	4.08	Q V				
0+50	0.1833	10.01	Q V				
0+55	0.2292	6.66	Q V				
1+ 0	0.2449	2.28	Q V				
1+ 5	0.2486	0.54	Q V				
1+10	0.2490	0.06	Q V				V

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 09/05/25 File: outprop10310.out

+++++

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

Program License Serial Number 6513

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

English Units used in output format

APN 915-330-040
Proposed Condition Unit Hydrograph
10-Year Design Storm
Area A-2 & A-3

Drainage Area = 3.01 (Ac.) = 0.005 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 3.01 (Ac.) =
0.005 Sq. Mi.
Length along longest watercourse = 440.00 (Ft.)
Length along longest watercourse measured to centroid = 220.00 (Ft.)
Length along longest watercourse = 0.083 Mi.
Length along longest watercourse measured to centroid = 0.042 Mi.
Difference in elevation = 35.50 (Ft.)
Slope along watercourse = 426.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.026 Hr.
Lag time = 1.59 Min.
25% of lag time = 0.40 Min.
40% of lag time = 0.64 Min.
Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00 (CFS)

2 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
3.01	1.02	3.07

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
3.01	2.79	8.40

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.020 (In)
Area Averaged 100-Year Rainfall = 2.790 (In)

Point rain (area averaged) = 1.748 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.748 (In)

Sub-Area Data:

Area (Ac.)	Runoff Index	Impervious %
3.010	89.00	0.000
Total Area Entered = 3.01 (Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
89.0	89.0	0.141	0.000	0.141	1.000	0.141
Sum (F) =						0.141

Area averaged mean soil loss (F) (In/Hr) = 0.141
Minimum soil loss rate ((In/Hr)) = 0.071
(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	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	314.516	58.123	1.763
2 0.167	629.033	36.344	1.103
3 0.250	943.549	5.533	0.168
Sum = 100.000		Sum=	3.034

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	1.30	0.273	0.141 (0.245)	0.131
2 0.17	1.30	0.273	0.141 (0.245)	0.131
3 0.25	1.10	0.231	0.141 (0.208)	0.089
4 0.33	1.50	0.315	0.141 (0.283)	0.173
5 0.42	1.50	0.315	0.141 (0.283)	0.173
6 0.50	1.80	0.378	0.141 (0.340)	0.236

7	0.58	1.50	0.315	0.141	(0.283)	0.173
8	0.67	1.80	0.378	0.141	(0.340)	0.236
9	0.75	1.80	0.378	0.141	(0.340)	0.236
10	0.83	1.50	0.315	0.141	(0.283)	0.173
11	0.92	1.60	0.336	0.141	(0.302)	0.194
12	1.00	1.80	0.378	0.141	(0.340)	0.236
13	1.08	2.20	0.462	0.141	(0.415)	0.320
14	1.17	2.20	0.462	0.141	(0.415)	0.320
15	1.25	2.20	0.462	0.141	(0.415)	0.320
16	1.33	2.00	0.420	0.141	(0.378)	0.278
17	1.42	2.60	0.545	0.141	(0.491)	0.404
18	1.50	2.70	0.566	0.141	(0.510)	0.425
19	1.58	2.40	0.503	0.141	(0.453)	0.362
20	1.67	2.70	0.566	0.141	(0.510)	0.425
21	1.75	3.30	0.692	0.141	(0.623)	0.551
22	1.83	3.10	0.650	0.141	(0.585)	0.509
23	1.92	2.90	0.608	0.141	(0.548)	0.467
24	2.00	3.00	0.629	0.141	(0.566)	0.488
25	2.08	3.10	0.650	0.141	(0.585)	0.509
26	2.17	4.20	0.881	0.141	(0.793)	0.740
27	2.25	5.00	1.049	0.141	(0.944)	0.908
28	2.33	3.50	0.734	0.141	(0.661)	0.593
29	2.42	6.80	1.427	0.141	(1.284)	1.285
30	2.50	7.30	1.531	0.141	(1.378)	1.390
31	2.58	8.20	1.720	0.141	(1.548)	1.579
32	2.67	5.90	1.238	0.141	(1.114)	1.096
33	2.75	2.00	0.420	0.141	(0.378)	0.278
34	2.83	1.80	0.378	0.141	(0.340)	0.236
35	2.92	1.80	0.378	0.141	(0.340)	0.236
36	3.00	0.60	0.126	(0.141)	0.113	0.013

(Loss Rate Not Used)

Sum = 100.0

Sum = 15.9

Flood volume = Effective rainfall 1.33(In)

times area 3.0(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)

Total soil loss = 0.42(In)

Total soil loss = 0.106(Ac.Ft)

Total rainfall = 1.75(In)

Flood volume = 14491.7 Cubic Feet

Total soil loss = 4609.3 Cubic Feet

Peak flow rate of this hydrograph = 4.534(CFS)

+++++

3 - 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	0.0016	0.23	Q				
0+10	0.0042	0.38	VQ				
0+15	0.0064	0.32	VQ				
0+20	0.0094	0.43	Q				
0+25	0.0129	0.51	VQ				

0+30	0.0173	0.64	Q					
0+35	0.0214	0.60	Q					
0+40	0.0258	0.65	QV					
0+45	0.0307	0.71	QV					
0+50	0.0349	0.61	Q V					
0+55	0.0388	0.57	Q V					
1+ 0	0.0434	0.66	Q V					
1+ 5	0.0493	0.86	Q V					
1+10	0.0559	0.96	Q V					
1+15	0.0626	0.97	Q V					
1+20	0.0687	0.90	Q V					
1+25	0.0761	1.07	Q V					
1+30	0.0847	1.24	Q V					
1+35	0.0928	1.18	Q V					
1+40	0.1012	1.22	Q V					
1+45	0.1115	1.50	Q V					
1+50	0.1224	1.58	Q V					
1+55	0.1326	1.48	Q V					
2+ 0	0.1426	1.46	Q V					
2+ 5	0.1531	1.51	Q V					
2+10	0.1665	1.95	Q V					
2+15	0.1837	2.50	Q V					
2+20	0.1987	2.17	Q V					
2+25	0.2198	3.07	Q V					
2+30	0.2472	3.97	Q V					
2+35	0.2784	4.53	Q V					
2+40	0.3053	3.91	Q V					
2+45	0.3188	1.97	Q V					
2+50	0.3251	0.91	Q V					
2+55	0.3301	0.72	Q V					
3+ 0	0.3323	0.32	Q V					
3+ 5	0.3327	0.05	Q V					
3+10	0.3327	0.00	Q V					

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 09/05/25 File: outprop10610.out

+++++

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

Program License Serial Number 6513

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

English Units used in output format

APN 915-330-040
Proposed Condition Unit Hydrograph
10-Year Design Storm
Area A-2 & A-3

Drainage Area = 3.01 (Ac.) = 0.005 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 3.01 (Ac.) =
0.005 Sq. Mi.
Length along longest watercourse = 440.00 (Ft.)
Length along longest watercourse measured to centroid = 220.00 (Ft.)
Length along longest watercourse = 0.083 Mi.
Length along longest watercourse measured to centroid = 0.042 Mi.
Difference in elevation = 35.50 (Ft.)
Slope along watercourse = 426.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.026 Hr.
Lag time = 1.59 Min.
25% of lag time = 0.40 Min.
40% of lag time = 0.64 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]
3.01	1.42	4.27

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
3.01	2.79	8.40

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.420 (In)
Area Averaged 100-Year Rainfall = 2.790 (In)

Point rain (area averaged) = 1.984 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.984 (In)

Sub-Area Data:

Area (Ac.)	Runoff Index	Impervious %
3.010	89.00	0.000
Total Area Entered = 3.01 (Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
89.0	89.0	0.141	0.000	0.141	1.000	0.141
Sum (F) =						0.141

Area averaged mean soil loss (F) (In/Hr) = 0.141
Minimum soil loss rate ((In/Hr)) = 0.071
(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	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	314.516	58.123	1.763
2 0.167	629.033	36.344	1.103
3 0.250	943.549	5.533	0.168
Sum = 100.000		Sum=	3.034

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	0.119	(0.141) 0.107	0.012
2 0.17	0.60	0.143	(0.141) 0.129	0.014
3 0.25	0.60	0.143	(0.141) 0.129	0.014
4 0.33	0.60	0.143	(0.141) 0.129	0.014
5 0.42	0.60	0.143	(0.141) 0.129	0.014
6 0.50	0.70	0.167	0.141 (0.150)	0.025

7	0.58	0.70	0.167	0.141	(0.150)	0.025
8	0.67	0.70	0.167	0.141	(0.150)	0.025
9	0.75	0.70	0.167	0.141	(0.150)	0.025
10	0.83	0.70	0.167	0.141	(0.150)	0.025
11	0.92	0.70	0.167	0.141	(0.150)	0.025
12	1.00	0.80	0.190	0.141	(0.171)	0.049
13	1.08	0.80	0.190	0.141	(0.171)	0.049
14	1.17	0.80	0.190	0.141	(0.171)	0.049
15	1.25	0.80	0.190	0.141	(0.171)	0.049
16	1.33	0.80	0.190	0.141	(0.171)	0.049
17	1.42	0.80	0.190	0.141	(0.171)	0.049
18	1.50	0.80	0.190	0.141	(0.171)	0.049
19	1.58	0.80	0.190	0.141	(0.171)	0.049
20	1.67	0.80	0.190	0.141	(0.171)	0.049
21	1.75	0.80	0.190	0.141	(0.171)	0.049
22	1.83	0.80	0.190	0.141	(0.171)	0.049
23	1.92	0.80	0.190	0.141	(0.171)	0.049
24	2.00	0.90	0.214	0.141	(0.193)	0.073
25	2.08	0.80	0.190	0.141	(0.171)	0.049
26	2.17	0.90	0.214	0.141	(0.193)	0.073
27	2.25	0.90	0.214	0.141	(0.193)	0.073
28	2.33	0.90	0.214	0.141	(0.193)	0.073
29	2.42	0.90	0.214	0.141	(0.193)	0.073
30	2.50	0.90	0.214	0.141	(0.193)	0.073
31	2.58	0.90	0.214	0.141	(0.193)	0.073
32	2.67	0.90	0.214	0.141	(0.193)	0.073
33	2.75	1.00	0.238	0.141	(0.214)	0.097
34	2.83	1.00	0.238	0.141	(0.214)	0.097
35	2.92	1.00	0.238	0.141	(0.214)	0.097
36	3.00	1.00	0.238	0.141	(0.214)	0.097
37	3.08	1.00	0.238	0.141	(0.214)	0.097
38	3.17	1.10	0.262	0.141	(0.236)	0.120
39	3.25	1.10	0.262	0.141	(0.236)	0.120
40	3.33	1.10	0.262	0.141	(0.236)	0.120
41	3.42	1.20	0.286	0.141	(0.257)	0.144
42	3.50	1.30	0.309	0.141	(0.278)	0.168
43	3.58	1.40	0.333	0.141	(0.300)	0.192
44	3.67	1.40	0.333	0.141	(0.300)	0.192
45	3.75	1.50	0.357	0.141	(0.321)	0.216
46	3.83	1.50	0.357	0.141	(0.321)	0.216
47	3.92	1.60	0.381	0.141	(0.343)	0.239
48	4.00	1.60	0.381	0.141	(0.343)	0.239
49	4.08	1.70	0.405	0.141	(0.364)	0.263
50	4.17	1.80	0.428	0.141	(0.386)	0.287
51	4.25	1.90	0.452	0.141	(0.407)	0.311
52	4.33	2.00	0.476	0.141	(0.428)	0.335
53	4.42	2.10	0.500	0.141	(0.450)	0.358
54	4.50	2.10	0.500	0.141	(0.450)	0.358
55	4.58	2.20	0.524	0.141	(0.471)	0.382
56	4.67	2.30	0.547	0.141	(0.493)	0.406
57	4.75	2.40	0.571	0.141	(0.514)	0.430
58	4.83	2.40	0.571	0.141	(0.514)	0.430
59	4.92	2.50	0.595	0.141	(0.536)	0.454
60	5.00	2.60	0.619	0.141	(0.557)	0.477
61	5.08	3.10	0.738	0.141	(0.664)	0.597
62	5.17	3.60	0.857	0.141	(0.771)	0.716

63	5.25	3.90	0.928	0.141	(0.835)	0.787
64	5.33	4.20	1.000	0.141	(0.900)	0.858
65	5.42	4.70	1.119	0.141	(1.007)	0.977
66	5.50	5.60	1.333	0.141	(1.200)	1.192
67	5.58	1.90	0.452	0.141	(0.407)	0.311
68	5.67	0.90	0.214	0.141	(0.193)	0.073
69	5.75	0.60	0.143	(0.141)	0.129	0.014
70	5.83	0.50	0.119	(0.141)	0.107	0.012
71	5.92	0.30	0.071	(0.141)	0.064	0.007
72	6.00	0.20	0.048	(0.141)	0.043	0.005

(Loss Rate Not Used)

Sum = 100.0

Sum = 13.9

Flood volume = Effective rainfall 1.16(In)

times area 3.0(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)

Total soil loss = 0.82(In)

Total soil loss = 0.206(Ac.Ft)

Total rainfall = 1.98(In)

Flood volume = 12684.6 Cubic Feet

Total soil loss = 8988.9 Cubic Feet

Peak flow rate of this hydrograph = 3.324(CFS)

+++++

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	0.0001	0.02	Q				
0+10	0.0004	0.04	Q				
0+15	0.0007	0.04	Q				
0+20	0.0010	0.04	Q				
0+25	0.0013	0.04	Q				
0+30	0.0017	0.06	Q				
0+35	0.0022	0.07	Q				
0+40	0.0028	0.08	Q				
0+45	0.0033	0.08	Q				
0+50	0.0038	0.08	Q				
0+55	0.0044	0.08	Q				
1+ 0	0.0052	0.12	Q				
1+ 5	0.0062	0.14	Q				
1+10	0.0072	0.15	Q				
1+15	0.0082	0.15	QV				
1+20	0.0092	0.15	QV				
1+25	0.0103	0.15	QV				
1+30	0.0113	0.15	QV				
1+35	0.0123	0.15	QV				
1+40	0.0133	0.15	QV				
1+45	0.0144	0.15	QV				
1+50	0.0154	0.15	Q V				
1+55	0.0164	0.15	Q V				
2+ 0	0.0177	0.19	Q V				
2+ 5	0.0189	0.18	Q V				

2+10	0.0203	0.19	Q V				
2+15	0.0218	0.22	Q V				
2+20	0.0233	0.22	Q V				
2+25	0.0248	0.22	Q V				
2+30	0.0263	0.22	Q V				
2+35	0.0279	0.22	Q V				
2+40	0.0294	0.22	Q V				
2+45	0.0312	0.26	Q V				
2+50	0.0332	0.29	Q V				
2+55	0.0352	0.29	Q V				
3+ 0	0.0372	0.29	Q V				
3+ 5	0.0392	0.29	Q V				
3+10	0.0416	0.34	Q V				
3+15	0.0440	0.36	Q V				
3+20	0.0466	0.37	Q V				
3+25	0.0494	0.41	Q V				
3+30	0.0526	0.48	Q V				
3+35	0.0564	0.55	Q V				
3+40	0.0604	0.58	Q V				
3+45	0.0647	0.62	Q V				
3+50	0.0692	0.65	Q V				
3+55	0.0740	0.70	Q V				
4+ 0	0.0790	0.72	Q V				
4+ 5	0.0843	0.77	Q V				
4+10	0.0900	0.84	Q V				
4+15	0.0963	0.91	Q V				
4+20	0.1030	0.98	Q V				
4+25	0.1103	1.05	Q V				
4+30	0.1178	1.08	Q V				
4+35	0.1255	1.13	Q V				
4+40	0.1338	1.20	Q V				
4+45	0.1425	1.27	Q V				
4+50	0.1515	1.30	Q V				
4+55	0.1608	1.35	Q V				
5+ 0	0.1705	1.41	Q V				
5+ 5	0.1819	1.66	Q V				
5+10	0.1957	2.00	Q V				
5+15	0.2114	2.28	Q V				
5+20	0.2286	2.50	Q V				
5+25	0.2479	2.80	Q V				
5+30	0.2708	3.32	Q V				
5+35	0.2848	2.03	Q V				
5+40	0.2894	0.67	Q V				
5+45	0.2905	0.16	Q V				
5+50	0.2908	0.05	Q V				
5+55	0.2910	0.03	Q V				
6+ 0	0.2911	0.02	Q V				
6+ 5	0.2912	0.01	Q V				
6+10	0.2912	0.00	Q V				

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018, Version 9.0
Study date 09/05/25 File: outprop102410.out

+++++

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

Program License Serial Number 6513

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

English Units used in output format

APN 915-330-040
Proposed Condition Unit Hydrograph
10-Year Design Storm
Area A-2 & A-3

Drainage Area = 3.01 (Ac.) = 0.005 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 3.01 (Ac.) =
0.005 Sq. Mi.
Length along longest watercourse = 440.00 (Ft.)
Length along longest watercourse measured to centroid = 220.00 (Ft.)
Length along longest watercourse = 0.083 Mi.
Length along longest watercourse measured to centroid = 0.042 Mi.
Difference in elevation = 35.50 (Ft.)
Slope along watercourse = 426.0000 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.026 Hr.
Lag time = 1.59 Min.
25% of lag time = 0.40 Min.
40% of lag time = 0.64 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]
3.01	2.51	7.56

100 YEAR Area rainfall data:

Area (Ac.) [1]	Rainfall (In) [2]	Weighting [1*2]
3.01	6.97	20.98

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.510 (In)
Area Averaged 100-Year Rainfall = 6.970 (In)

Point rain (area averaged) = 4.345 (In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 4.345 (In)

Sub-Area Data:

Area (Ac.)	Runoff Index	Impervious %
3.010	89.00	0.000
Total Area Entered = 3.01 (Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
89.0	89.0	0.141	0.000	0.141	1.000	0.141
Sum (F) =						0.141

Area averaged mean soil loss (F) (In/Hr) = 0.141
Minimum soil loss rate ((In/Hr)) = 0.071
(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	Distribution Graph %	Unit Hydrograph (CFS)
1	0.083	314.516	58.123
2	0.167	629.033	36.344
3	0.250	943.549	5.533
Sum =		100.000	Sum= 3.034

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	0.035	(0.251)	0.031
2	0.17	0.035	(0.250)	0.031
3	0.25	0.035	(0.249)	0.031
4	0.33	0.052	(0.248)	0.047
5	0.42	0.052	(0.247)	0.047
6	0.50	0.052	(0.246)	0.047

7	0.58	0.10	0.052	(0.245)	0.047	0.005
8	0.67	0.10	0.052	(0.244)	0.047	0.005
9	0.75	0.10	0.052	(0.243)	0.047	0.005
10	0.83	0.13	0.070	(0.242)	0.063	0.007
11	0.92	0.13	0.070	(0.241)	0.063	0.007
12	1.00	0.13	0.070	(0.240)	0.063	0.007
13	1.08	0.10	0.052	(0.239)	0.047	0.005
14	1.17	0.10	0.052	(0.238)	0.047	0.005
15	1.25	0.10	0.052	(0.237)	0.047	0.005
16	1.33	0.10	0.052	(0.236)	0.047	0.005
17	1.42	0.10	0.052	(0.235)	0.047	0.005
18	1.50	0.10	0.052	(0.234)	0.047	0.005
19	1.58	0.10	0.052	(0.234)	0.047	0.005
20	1.67	0.10	0.052	(0.233)	0.047	0.005
21	1.75	0.10	0.052	(0.232)	0.047	0.005
22	1.83	0.13	0.070	(0.231)	0.063	0.007
23	1.92	0.13	0.070	(0.230)	0.063	0.007
24	2.00	0.13	0.070	(0.229)	0.063	0.007
25	2.08	0.13	0.070	(0.228)	0.063	0.007
26	2.17	0.13	0.070	(0.227)	0.063	0.007
27	2.25	0.13	0.070	(0.226)	0.063	0.007
28	2.33	0.13	0.070	(0.225)	0.063	0.007
29	2.42	0.13	0.070	(0.224)	0.063	0.007
30	2.50	0.13	0.070	(0.223)	0.063	0.007
31	2.58	0.17	0.087	(0.222)	0.078	0.009
32	2.67	0.17	0.087	(0.221)	0.078	0.009
33	2.75	0.17	0.087	(0.221)	0.078	0.009
34	2.83	0.17	0.087	(0.220)	0.078	0.009
35	2.92	0.17	0.087	(0.219)	0.078	0.009
36	3.00	0.17	0.087	(0.218)	0.078	0.009
37	3.08	0.17	0.087	(0.217)	0.078	0.009
38	3.17	0.17	0.087	(0.216)	0.078	0.009
39	3.25	0.17	0.087	(0.215)	0.078	0.009
40	3.33	0.17	0.087	(0.214)	0.078	0.009
41	3.42	0.17	0.087	(0.213)	0.078	0.009
42	3.50	0.17	0.087	(0.212)	0.078	0.009
43	3.58	0.17	0.087	(0.212)	0.078	0.009
44	3.67	0.17	0.087	(0.211)	0.078	0.009
45	3.75	0.17	0.087	(0.210)	0.078	0.009
46	3.83	0.20	0.104	(0.209)	0.094	0.010
47	3.92	0.20	0.104	(0.208)	0.094	0.010
48	4.00	0.20	0.104	(0.207)	0.094	0.010
49	4.08	0.20	0.104	(0.206)	0.094	0.010
50	4.17	0.20	0.104	(0.205)	0.094	0.010
51	4.25	0.20	0.104	(0.205)	0.094	0.010
52	4.33	0.23	0.122	(0.204)	0.109	0.012
53	4.42	0.23	0.122	(0.203)	0.109	0.012
54	4.50	0.23	0.122	(0.202)	0.109	0.012
55	4.58	0.23	0.122	(0.201)	0.109	0.012
56	4.67	0.23	0.122	(0.200)	0.109	0.012
57	4.75	0.23	0.122	(0.199)	0.109	0.012
58	4.83	0.27	0.139	(0.198)	0.125	0.014
59	4.92	0.27	0.139	(0.198)	0.125	0.014
60	5.00	0.27	0.139	(0.197)	0.125	0.014
61	5.08	0.20	0.104	(0.196)	0.094	0.010
62	5.17	0.20	0.104	(0.195)	0.094	0.010

63	5.25	0.20	0.104	(0.194)	0.094	0.010
64	5.33	0.23	0.122	(0.193)	0.109	0.012
65	5.42	0.23	0.122	(0.193)	0.109	0.012
66	5.50	0.23	0.122	(0.192)	0.109	0.012
67	5.58	0.27	0.139	(0.191)	0.125	0.014
68	5.67	0.27	0.139	(0.190)	0.125	0.014
69	5.75	0.27	0.139	(0.189)	0.125	0.014
70	5.83	0.27	0.139	(0.188)	0.125	0.014
71	5.92	0.27	0.139	(0.187)	0.125	0.014
72	6.00	0.27	0.139	(0.187)	0.125	0.014
73	6.08	0.30	0.156	(0.186)	0.141	0.016
74	6.17	0.30	0.156	(0.185)	0.141	0.016
75	6.25	0.30	0.156	(0.184)	0.141	0.016
76	6.33	0.30	0.156	(0.183)	0.141	0.016
77	6.42	0.30	0.156	(0.183)	0.141	0.016
78	6.50	0.30	0.156	(0.182)	0.141	0.016
79	6.58	0.33	0.174	(0.181)	0.156	0.017
80	6.67	0.33	0.174	(0.180)	0.156	0.017
81	6.75	0.33	0.174	(0.179)	0.156	0.017
82	6.83	0.33	0.174	(0.178)	0.156	0.017
83	6.92	0.33	0.174	(0.178)	0.156	0.017
84	7.00	0.33	0.174	(0.177)	0.156	0.017
85	7.08	0.33	0.174	(0.176)	0.156	0.017
86	7.17	0.33	0.174	(0.175)	0.156	0.017
87	7.25	0.33	0.174	(0.174)	0.156	0.017
88	7.33	0.37	0.191	(0.174)	0.172	0.019
89	7.42	0.37	0.191	(0.173)	0.172	0.019
90	7.50	0.37	0.191	0.172	(0.172)	0.019
91	7.58	0.40	0.209	0.171	(0.188)	0.037
92	7.67	0.40	0.209	0.170	(0.188)	0.038
93	7.75	0.40	0.209	0.170	(0.188)	0.039
94	7.83	0.43	0.226	0.169	(0.203)	0.057
95	7.92	0.43	0.226	0.168	(0.203)	0.058
96	8.00	0.43	0.226	0.167	(0.203)	0.059
97	8.08	0.50	0.261	0.167	(0.235)	0.094
98	8.17	0.50	0.261	0.166	(0.235)	0.095
99	8.25	0.50	0.261	0.165	(0.235)	0.096
100	8.33	0.50	0.261	0.164	(0.235)	0.096
101	8.42	0.50	0.261	0.163	(0.235)	0.097
102	8.50	0.50	0.261	0.163	(0.235)	0.098
103	8.58	0.53	0.278	0.162	(0.250)	0.116
104	8.67	0.53	0.278	0.161	(0.250)	0.117
105	8.75	0.53	0.278	0.160	(0.250)	0.118
106	8.83	0.57	0.295	0.160	(0.266)	0.136
107	8.92	0.57	0.295	0.159	(0.266)	0.137
108	9.00	0.57	0.295	0.158	(0.266)	0.137
109	9.08	0.63	0.330	0.157	(0.297)	0.173
110	9.17	0.63	0.330	0.157	(0.297)	0.174
111	9.25	0.63	0.330	0.156	(0.297)	0.174
112	9.33	0.67	0.348	0.155	(0.313)	0.192
113	9.42	0.67	0.348	0.154	(0.313)	0.193
114	9.50	0.67	0.348	0.154	(0.313)	0.194
115	9.58	0.70	0.365	0.153	(0.328)	0.212
116	9.67	0.70	0.365	0.152	(0.328)	0.213
117	9.75	0.70	0.365	0.151	(0.328)	0.213
118	9.83	0.73	0.382	0.151	(0.344)	0.232

119	9.92	0.73	0.382	0.150	(0.344)	0.232
120	10.00	0.73	0.382	0.149	(0.344)	0.233
121	10.08	0.50	0.261	0.149	(0.235)	0.112
122	10.17	0.50	0.261	0.148	(0.235)	0.113
123	10.25	0.50	0.261	0.147	(0.235)	0.114
124	10.33	0.50	0.261	0.146	(0.235)	0.114
125	10.42	0.50	0.261	0.146	(0.235)	0.115
126	10.50	0.50	0.261	0.145	(0.235)	0.116
127	10.58	0.67	0.348	0.144	(0.313)	0.203
128	10.67	0.67	0.348	0.144	(0.313)	0.204
129	10.75	0.67	0.348	0.143	(0.313)	0.205
130	10.83	0.67	0.348	0.142	(0.313)	0.205
131	10.92	0.67	0.348	0.142	(0.313)	0.206
132	11.00	0.67	0.348	0.141	(0.313)	0.207
133	11.08	0.63	0.330	0.140	(0.297)	0.190
134	11.17	0.63	0.330	0.139	(0.297)	0.191
135	11.25	0.63	0.330	0.139	(0.297)	0.191
136	11.33	0.63	0.330	0.138	(0.297)	0.192
137	11.42	0.63	0.330	0.137	(0.297)	0.193
138	11.50	0.63	0.330	0.137	(0.297)	0.194
139	11.58	0.57	0.295	0.136	(0.266)	0.159
140	11.67	0.57	0.295	0.135	(0.266)	0.160
141	11.75	0.57	0.295	0.135	(0.266)	0.161
142	11.83	0.60	0.313	0.134	(0.282)	0.179
143	11.92	0.60	0.313	0.133	(0.282)	0.180
144	12.00	0.60	0.313	0.133	(0.282)	0.180
145	12.08	0.83	0.434	0.132	(0.391)	0.302
146	12.17	0.83	0.434	0.131	(0.391)	0.303
147	12.25	0.83	0.434	0.131	(0.391)	0.304
148	12.33	0.87	0.452	0.130	(0.407)	0.322
149	12.42	0.87	0.452	0.129	(0.407)	0.322
150	12.50	0.87	0.452	0.129	(0.407)	0.323
151	12.58	0.93	0.487	0.128	(0.438)	0.359
152	12.67	0.93	0.487	0.127	(0.438)	0.359
153	12.75	0.93	0.487	0.127	(0.438)	0.360
154	12.83	0.97	0.504	0.126	(0.454)	0.378
155	12.92	0.97	0.504	0.126	(0.454)	0.379
156	13.00	0.97	0.504	0.125	(0.454)	0.379
157	13.08	1.13	0.591	0.124	(0.532)	0.467
158	13.17	1.13	0.591	0.124	(0.532)	0.467
159	13.25	1.13	0.591	0.123	(0.532)	0.468
160	13.33	1.13	0.591	0.122	(0.532)	0.469
161	13.42	1.13	0.591	0.122	(0.532)	0.469
162	13.50	1.13	0.591	0.121	(0.532)	0.470
163	13.58	0.77	0.400	0.120	(0.360)	0.279
164	13.67	0.77	0.400	0.120	(0.360)	0.280
165	13.75	0.77	0.400	0.119	(0.360)	0.280
166	13.83	0.77	0.400	0.119	(0.360)	0.281
167	13.92	0.77	0.400	0.118	(0.360)	0.282
168	14.00	0.77	0.400	0.117	(0.360)	0.282
169	14.08	0.90	0.469	0.117	(0.422)	0.352
170	14.17	0.90	0.469	0.116	(0.422)	0.353
171	14.25	0.90	0.469	0.116	(0.422)	0.354
172	14.33	0.87	0.452	0.115	(0.407)	0.337
173	14.42	0.87	0.452	0.114	(0.407)	0.337
174	14.50	0.87	0.452	0.114	(0.407)	0.338

175	14.58	0.87	0.452	0.113	(0.407)	0.339
176	14.67	0.87	0.452	0.113	(0.407)	0.339
177	14.75	0.87	0.452	0.112	(0.407)	0.340
178	14.83	0.83	0.434	0.112	(0.391)	0.323
179	14.92	0.83	0.434	0.111	(0.391)	0.323
180	15.00	0.83	0.434	0.110	(0.391)	0.324
181	15.08	0.80	0.417	0.110	(0.375)	0.307
182	15.17	0.80	0.417	0.109	(0.375)	0.308
183	15.25	0.80	0.417	0.109	(0.375)	0.308
184	15.33	0.77	0.400	0.108	(0.360)	0.292
185	15.42	0.77	0.400	0.108	(0.360)	0.292
186	15.50	0.77	0.400	0.107	(0.360)	0.293
187	15.58	0.63	0.330	0.107	(0.297)	0.224
188	15.67	0.63	0.330	0.106	(0.297)	0.224
189	15.75	0.63	0.330	0.105	(0.297)	0.225
190	15.83	0.63	0.330	0.105	(0.297)	0.225
191	15.92	0.63	0.330	0.104	(0.297)	0.226
192	16.00	0.63	0.330	0.104	(0.297)	0.226
193	16.08	0.13	0.070	(0.103)	0.063	0.007
194	16.17	0.13	0.070	(0.103)	0.063	0.007
195	16.25	0.13	0.070	(0.102)	0.063	0.007
196	16.33	0.13	0.070	(0.102)	0.063	0.007
197	16.42	0.13	0.070	(0.101)	0.063	0.007
198	16.50	0.13	0.070	(0.101)	0.063	0.007
199	16.58	0.10	0.052	(0.100)	0.047	0.005
200	16.67	0.10	0.052	(0.100)	0.047	0.005
201	16.75	0.10	0.052	(0.099)	0.047	0.005
202	16.83	0.10	0.052	(0.099)	0.047	0.005
203	16.92	0.10	0.052	(0.098)	0.047	0.005
204	17.00	0.10	0.052	(0.098)	0.047	0.005
205	17.08	0.17	0.087	(0.097)	0.078	0.009
206	17.17	0.17	0.087	(0.097)	0.078	0.009
207	17.25	0.17	0.087	(0.096)	0.078	0.009
208	17.33	0.17	0.087	(0.096)	0.078	0.009
209	17.42	0.17	0.087	(0.095)	0.078	0.009
210	17.50	0.17	0.087	(0.095)	0.078	0.009
211	17.58	0.17	0.087	(0.094)	0.078	0.009
212	17.67	0.17	0.087	(0.094)	0.078	0.009
213	17.75	0.17	0.087	(0.093)	0.078	0.009
214	17.83	0.13	0.070	(0.093)	0.063	0.007
215	17.92	0.13	0.070	(0.092)	0.063	0.007
216	18.00	0.13	0.070	(0.092)	0.063	0.007
217	18.08	0.13	0.070	(0.092)	0.063	0.007
218	18.17	0.13	0.070	(0.091)	0.063	0.007
219	18.25	0.13	0.070	(0.091)	0.063	0.007
220	18.33	0.13	0.070	(0.090)	0.063	0.007
221	18.42	0.13	0.070	(0.090)	0.063	0.007
222	18.50	0.13	0.070	(0.089)	0.063	0.007
223	18.58	0.10	0.052	(0.089)	0.047	0.005
224	18.67	0.10	0.052	(0.088)	0.047	0.005
225	18.75	0.10	0.052	(0.088)	0.047	0.005
226	18.83	0.07	0.035	(0.088)	0.031	0.003
227	18.92	0.07	0.035	(0.087)	0.031	0.003
228	19.00	0.07	0.035	(0.087)	0.031	0.003
229	19.08	0.10	0.052	(0.086)	0.047	0.005
230	19.17	0.10	0.052	(0.086)	0.047	0.005

231	19.25	0.10	0.052	(0.086)	0.047	0.005
232	19.33	0.13	0.070	(0.085)	0.063	0.007
233	19.42	0.13	0.070	(0.085)	0.063	0.007
234	19.50	0.13	0.070	(0.084)	0.063	0.007
235	19.58	0.10	0.052	(0.084)	0.047	0.005
236	19.67	0.10	0.052	(0.084)	0.047	0.005
237	19.75	0.10	0.052	(0.083)	0.047	0.005
238	19.83	0.07	0.035	(0.083)	0.031	0.003
239	19.92	0.07	0.035	(0.082)	0.031	0.003
240	20.00	0.07	0.035	(0.082)	0.031	0.003
241	20.08	0.10	0.052	(0.082)	0.047	0.005
242	20.17	0.10	0.052	(0.081)	0.047	0.005
243	20.25	0.10	0.052	(0.081)	0.047	0.005
244	20.33	0.10	0.052	(0.081)	0.047	0.005
245	20.42	0.10	0.052	(0.080)	0.047	0.005
246	20.50	0.10	0.052	(0.080)	0.047	0.005
247	20.58	0.10	0.052	(0.080)	0.047	0.005
248	20.67	0.10	0.052	(0.079)	0.047	0.005
249	20.75	0.10	0.052	(0.079)	0.047	0.005
250	20.83	0.07	0.035	(0.079)	0.031	0.003
251	20.92	0.07	0.035	(0.078)	0.031	0.003
252	21.00	0.07	0.035	(0.078)	0.031	0.003
253	21.08	0.10	0.052	(0.078)	0.047	0.005
254	21.17	0.10	0.052	(0.077)	0.047	0.005
255	21.25	0.10	0.052	(0.077)	0.047	0.005
256	21.33	0.07	0.035	(0.077)	0.031	0.003
257	21.42	0.07	0.035	(0.077)	0.031	0.003
258	21.50	0.07	0.035	(0.076)	0.031	0.003
259	21.58	0.10	0.052	(0.076)	0.047	0.005
260	21.67	0.10	0.052	(0.076)	0.047	0.005
261	21.75	0.10	0.052	(0.075)	0.047	0.005
262	21.83	0.07	0.035	(0.075)	0.031	0.003
263	21.92	0.07	0.035	(0.075)	0.031	0.003
264	22.00	0.07	0.035	(0.075)	0.031	0.003
265	22.08	0.10	0.052	(0.074)	0.047	0.005
266	22.17	0.10	0.052	(0.074)	0.047	0.005
267	22.25	0.10	0.052	(0.074)	0.047	0.005
268	22.33	0.07	0.035	(0.074)	0.031	0.003
269	22.42	0.07	0.035	(0.073)	0.031	0.003
270	22.50	0.07	0.035	(0.073)	0.031	0.003
271	22.58	0.07	0.035	(0.073)	0.031	0.003
272	22.67	0.07	0.035	(0.073)	0.031	0.003
273	22.75	0.07	0.035	(0.073)	0.031	0.003
274	22.83	0.07	0.035	(0.072)	0.031	0.003
275	22.92	0.07	0.035	(0.072)	0.031	0.003
276	23.00	0.07	0.035	(0.072)	0.031	0.003
277	23.08	0.07	0.035	(0.072)	0.031	0.003
278	23.17	0.07	0.035	(0.072)	0.031	0.003
279	23.25	0.07	0.035	(0.072)	0.031	0.003
280	23.33	0.07	0.035	(0.071)	0.031	0.003
281	23.42	0.07	0.035	(0.071)	0.031	0.003
282	23.50	0.07	0.035	(0.071)	0.031	0.003
283	23.58	0.07	0.035	(0.071)	0.031	0.003
284	23.67	0.07	0.035	(0.071)	0.031	0.003
285	23.75	0.07	0.035	(0.071)	0.031	0.003
286	23.83	0.07	0.035	(0.071)	0.031	0.003

287 23.92 0.07 0.035 (0.071) 0.031 0.003
 288 24.00 0.07 0.035 (0.071) 0.031 0.003

(Loss Rate Not Used)

Sum = 100.0

Sum = 25.4

Flood volume = Effective rainfall 2.11(In)

times area 3.0(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)

Total soil loss = 2.23(In)

Total soil loss = 0.559(Ac.Ft)

Total rainfall = 4.34(In)

Flood volume = 23104.0 Cubic Feet

Total soil loss = 24369.1 Cubic Feet

 Peak flow rate of this hydrograph = 1.425(CFS)

+++++

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	0.01	Q				
0+10	0.0001	0.01	Q				
0+15	0.0002	0.01	Q				
0+20	0.0003	0.01	Q				
0+25	0.0004	0.02	Q				
0+30	0.0005	0.02	Q				
0+35	0.0006	0.02	Q				
0+40	0.0007	0.02	Q				
0+45	0.0008	0.02	Q				
0+50	0.0010	0.02	Q				
0+55	0.0011	0.02	Q				
1+ 0	0.0012	0.02	Q				
1+ 5	0.0014	0.02	Q				
1+10	0.0015	0.02	Q				
1+15	0.0016	0.02	Q				
1+20	0.0017	0.02	Q				
1+25	0.0018	0.02	Q				
1+30	0.0019	0.02	Q				
1+35	0.0020	0.02	Q				
1+40	0.0021	0.02	Q				
1+45	0.0022	0.02	Q				
1+50	0.0024	0.02	Q				
1+55	0.0025	0.02	Q				
2+ 0	0.0027	0.02	Q				
2+ 5	0.0028	0.02	Q				
2+10	0.0029	0.02	Q				
2+15	0.0031	0.02	Q				
2+20	0.0032	0.02	Q				
2+25	0.0034	0.02	Q				
2+30	0.0035	0.02	Q				
2+35	0.0037	0.02	Q				
2+40	0.0039	0.03	Q				
2+45	0.0041	0.03	Q				

2+50	0.0042	0.03	Q				
2+55	0.0044	0.03	Q				
3+ 0	0.0046	0.03	Q				
3+ 5	0.0048	0.03	Q				
3+10	0.0050	0.03	Q				
3+15	0.0051	0.03	Q				
3+20	0.0053	0.03	Q				
3+25	0.0055	0.03	Q				
3+30	0.0057	0.03	Q				
3+35	0.0059	0.03	Q				
3+40	0.0061	0.03	Q				
3+45	0.0062	0.03	Q				
3+50	0.0064	0.03	Q				
3+55	0.0067	0.03	Q				
4+ 0	0.0069	0.03	Q				
4+ 5	0.0071	0.03	Q				
4+10	0.0073	0.03	Q				
4+15	0.0075	0.03	Q				
4+20	0.0078	0.03	Q				
4+25	0.0080	0.04	Q				
4+30	0.0083	0.04	Q				
4+35	0.0085	0.04	Q				
4+40	0.0088	0.04	Q				
4+45	0.0090	0.04	Q				
4+50	0.0093	0.04	Q				
4+55	0.0096	0.04	Q				
5+ 0	0.0099	0.04	Q				
5+ 5	0.0101	0.04	Q				
5+10	0.0104	0.03	Q				
5+15	0.0106	0.03	Q				
5+20	0.0108	0.03	Q				
5+25	0.0111	0.04	Q				
5+30	0.0113	0.04	Q				
5+35	0.0116	0.04	Q				
5+40	0.0119	0.04	Q				
5+45	0.0122	0.04	Q				
5+50	0.0125	0.04	Q				
5+55	0.0128	0.04	Q				
6+ 0	0.0130	0.04	Q				
6+ 5	0.0134	0.05	QV				
6+10	0.0137	0.05	QV				
6+15	0.0140	0.05	QV				
6+20	0.0143	0.05	QV				
6+25	0.0147	0.05	QV				
6+30	0.0150	0.05	QV				
6+35	0.0153	0.05	QV				
6+40	0.0157	0.05	QV				
6+45	0.0161	0.05	QV				
6+50	0.0164	0.05	QV				
6+55	0.0168	0.05	QV				
7+ 0	0.0172	0.05	QV				
7+ 5	0.0175	0.05	QV				
7+10	0.0179	0.05	QV				
7+15	0.0182	0.05	QV				
7+20	0.0186	0.06	QV				
7+25	0.0190	0.06	QV				

7+30	0.0194	0.06	QV				
7+35	0.0200	0.09	QV				
7+40	0.0208	0.11	QV				
7+45	0.0216	0.12	QV				
7+50	0.0227	0.15	QV				
7+55	0.0238	0.17	QV				
8+ 0	0.0251	0.18	QV				
8+ 5	0.0267	0.24	Q V				
8+10	0.0286	0.28	QV				
8+15	0.0306	0.29	QV				
8+20	0.0326	0.29	QV				
8+25	0.0347	0.29	QV				
8+30	0.0367	0.30	QV				
8+35	0.0390	0.33	QV				
8+40	0.0414	0.35	Q V				
8+45	0.0438	0.36	Q V				
8+50	0.0465	0.39	Q V				
8+55	0.0493	0.41	Q V				
9+ 0	0.0522	0.42	Q V				
9+ 5	0.0555	0.48	Q V				
9+10	0.0591	0.52	Q V				
9+15	0.0627	0.53	Q V				
9+20	0.0666	0.56	Q V				
9+25	0.0706	0.58	Q V				
9+30	0.0746	0.59	Q V				
9+35	0.0789	0.62	Q V				
9+40	0.0833	0.64	Q V				
9+45	0.0878	0.65	Q V				
9+50	0.0925	0.68	Q V				
9+55	0.0973	0.70	Q V				
10+ 0	0.1022	0.71	Q V				
10+ 5	0.1056	0.49	Q V				
10+10	0.1081	0.36	Q V				
10+15	0.1104	0.34	Q V				
10+20	0.1128	0.35	Q V				
10+25	0.1152	0.35	Q V				
10+30	0.1176	0.35	Q V				
10+35	0.1211	0.51	Q V				
10+40	0.1252	0.60	Q V				
10+45	0.1295	0.62	Q V				
10+50	0.1338	0.62	Q V				
10+55	0.1381	0.62	Q V				
11+ 0	0.1424	0.63	Q V				
11+ 5	0.1465	0.60	Q V				
11+10	0.1505	0.58	Q V				
11+15	0.1545	0.58	Q V				
11+20	0.1585	0.58	Q V				
11+25	0.1626	0.58	Q V				
11+30	0.1666	0.59	Q V				
11+35	0.1702	0.53	Q V				
11+40	0.1736	0.49	Q V				
11+45	0.1770	0.49	Q V				
11+50	0.1806	0.52	Q V				
11+55	0.1843	0.54	Q V				
12+ 0	0.1880	0.55	Q V				
12+ 5	0.1933	0.76	Q V				

12+10	0.1995	0.90	Q		V			
12+15	0.2058	0.92	Q		V			
12+20	0.2124	0.95	Q		V			
12+25	0.2191	0.97	Q		V			
12+30	0.2259	0.98	Q		V			
12+35	0.2330	1.04	Q		V			
12+40	0.2405	1.08	Q		V			
12+45	0.2480	1.09	Q		V			
12+50	0.2558	1.12	Q		V			
12+55	0.2636	1.14	Q		V			
13+ 0	0.2716	1.15	Q		V			
13+ 5	0.2805	1.31	Q		V			
13+10	0.2902	1.40	Q		V			
13+15	0.3000	1.42	Q		V			
13+20	0.3098	1.42	Q		V			
13+25	0.3196	1.42	Q		V			
13+30	0.3294	1.42	Q		V			
13+35	0.3369	1.09	Q		V			
13+40	0.3430	0.88	Q		V			
13+45	0.3488	0.85	Q		V			
13+50	0.3547	0.85	Q		V			
13+55	0.3606	0.85	Q		V			
14+ 0	0.3665	0.86	Q		V			
14+ 5	0.3732	0.98	Q		V			
14+10	0.3805	1.06	Q		V			
14+15	0.3879	1.07	Q		V			
14+20	0.3951	1.04	Q		V			
14+25	0.4021	1.03	Q		V			
14+30	0.4092	1.02	Q		V			
14+35	0.4163	1.03	Q		V			
14+40	0.4233	1.03	Q		V			
14+45	0.4304	1.03	Q		V			
14+50	0.4373	1.00	Q		V			
14+55	0.4441	0.98	Q		V			
15+ 0	0.4509	0.98	Q		V			
15+ 5	0.4575	0.95	Q		V			
15+10	0.4639	0.94	Q		V			
15+15	0.4703	0.94	Q		V			
15+20	0.4766	0.91	Q		V			
15+25	0.4827	0.89	Q		V			
15+30	0.4888	0.89	Q		V			
15+35	0.4941	0.77	Q		V			
15+40	0.4989	0.69	Q		V			
15+45	0.5035	0.68	Q		V			
15+50	0.5082	0.68	Q		V			
15+55	0.5130	0.68	Q		V			
16+ 0	0.5177	0.69	Q		V			
16+ 5	0.5198	0.30	Q		V			
16+10	0.5202	0.06	Q		V			
16+15	0.5203	0.02	Q		V			
16+20	0.5204	0.02	Q		V			
16+25	0.5206	0.02	Q		V			
16+30	0.5207	0.02	Q		V			
16+35	0.5209	0.02	Q		V			
16+40	0.5210	0.02	Q		V			
16+45	0.5211	0.02	Q		V			

16+50	0.5212	0.02	Q				V
16+55	0.5213	0.02	Q				V
17+ 0	0.5214	0.02	Q				V
17+ 5	0.5216	0.02	Q				V
17+10	0.5217	0.03	Q				V
17+15	0.5219	0.03	Q				V
17+20	0.5221	0.03	Q				V
17+25	0.5223	0.03	Q				V
17+30	0.5225	0.03	Q				V
17+35	0.5226	0.03	Q				V
17+40	0.5228	0.03	Q				V
17+45	0.5230	0.03	Q				V
17+50	0.5232	0.02	Q				V
17+55	0.5233	0.02	Q				V
18+ 0	0.5235	0.02	Q				V
18+ 5	0.5236	0.02	Q				V
18+10	0.5238	0.02	Q				V
18+15	0.5239	0.02	Q				V
18+20	0.5240	0.02	Q				V
18+25	0.5242	0.02	Q				V
18+30	0.5243	0.02	Q				V
18+35	0.5245	0.02	Q				V
18+40	0.5246	0.02	Q				V
18+45	0.5247	0.02	Q				V
18+50	0.5248	0.01	Q				V
18+55	0.5248	0.01	Q				V
19+ 0	0.5249	0.01	Q				V
19+ 5	0.5250	0.01	Q				V
19+10	0.5251	0.02	Q				V
19+15	0.5252	0.02	Q				V
19+20	0.5254	0.02	Q				V
19+25	0.5255	0.02	Q				V
19+30	0.5256	0.02	Q				V
19+35	0.5258	0.02	Q				V
19+40	0.5259	0.02	Q				V
19+45	0.5260	0.02	Q				V
19+50	0.5261	0.01	Q				V
19+55	0.5261	0.01	Q				V
20+ 0	0.5262	0.01	Q				V
20+ 5	0.5263	0.01	Q				V
20+10	0.5264	0.02	Q				V
20+15	0.5265	0.02	Q				V
20+20	0.5266	0.02	Q				V
20+25	0.5267	0.02	Q				V
20+30	0.5269	0.02	Q				V
20+35	0.5270	0.02	Q				V
20+40	0.5271	0.02	Q				V
20+45	0.5272	0.02	Q				V
20+50	0.5273	0.01	Q				V
20+55	0.5273	0.01	Q				V
21+ 0	0.5274	0.01	Q				V
21+ 5	0.5275	0.01	Q				V
21+10	0.5276	0.02	Q				V
21+15	0.5277	0.02	Q				V
21+20	0.5278	0.01	Q				V
21+25	0.5279	0.01	Q				V

21+30	0.5280	0.01	Q				V
21+35	0.5281	0.01	Q				V
21+40	0.5282	0.02	Q				V
21+45	0.5283	0.02	Q				V
21+50	0.5284	0.01	Q				V
21+55	0.5284	0.01	Q				V
22+ 0	0.5285	0.01	Q				V
22+ 5	0.5286	0.01	Q				V
22+10	0.5287	0.02	Q				V
22+15	0.5288	0.02	Q				V
22+20	0.5289	0.01	Q				V
22+25	0.5290	0.01	Q				V
22+30	0.5291	0.01	Q				V
22+35	0.5291	0.01	Q				V
22+40	0.5292	0.01	Q				V
22+45	0.5293	0.01	Q				V
22+50	0.5293	0.01	Q				V
22+55	0.5294	0.01	Q				V
23+ 0	0.5295	0.01	Q				V
23+ 5	0.5296	0.01	Q				V
23+10	0.5296	0.01	Q				V
23+15	0.5297	0.01	Q				V
23+20	0.5298	0.01	Q				V
23+25	0.5299	0.01	Q				V
23+30	0.5299	0.01	Q				V
23+35	0.5300	0.01	Q				V
23+40	0.5301	0.01	Q				V
23+45	0.5301	0.01	Q				V
23+50	0.5302	0.01	Q				V
23+55	0.5303	0.01	Q				V
24+ 0	0.5304	0.01	Q				V
24+ 5	0.5304	0.00	Q				V
24+10	0.5304	0.00	Q				V

Preliminary Basin Analysis

Existing Condition

Area ID	Storm Event	Acreage	Qpeak (Cfs)	Volume (Acft)
A-1 to A-3	10 Year, 1 Hr	4.9	15.10	0.41
A-1 to A-3	10 Year, 3 Hr	4.9	7.23	0.54
A-1 to A-3	10 Year, 6 Hr	4.9	5.31	0.47
A-1 to A-3	10 Year, 24 Hr	4.9	2.32	0.86

Proposed Condition (Disturbed Areas)

Area ID	Storm Event	Acreage	Qpeak (Cfs)	Volume (Acft)
A-1 & A-4	10 Year, 1 Hr	1.89	6.92	0.17
A-1 & A-4	10 Year, 3 Hr	1.89	3.04	0.25
A-1 & A-4	10 Year, 6 Hr	1.89	2.29	0.26
A-1 & A-4	10 Year, 24 Hr	1.89	1.03	0.56

Proposed Condition (Undisturbed Areas)

Area ID	Storm Event	Acreage	Qpeak (Cfs)	Volume (Acft)
A-2 & A-3	10 Year, 1 Hr	3.01	10.01	0.25
A-2 & A-3	10 Year, 3 Hr	3.01	4.53	0.33
A-2 & A-3	10 Year, 6 Hr	3.01	3.32	0.29
A-2 & A-3	10 Year, 24 Hr	3.01	1.43	0.53

Total Proposed

Area ID	Storm Event	Acreage	Qpeak (Cfs)	Volume (Acft)
A-1 to A-4	10 Year, 1 Hr	4.9	16.93	0.42
A-1 to A-4	10 Year, 3 Hr	4.9	7.58	0.58
A-1 to A-4	10 Year, 6 Hr	4.9	5.61	0.55
A-1 to A-4	10 Year, 24 Hr	4.9	2.46	1.09

Preliminary Basin Volume Analysis

Storm Event	Existing Condition		Proposed Condition		Comparison		
	Qpeak (Cfs)	Volume (Acft)	Qpeak (Cfs)	Volume (Acft)	Delta Flow (cfs)	Delta Volume (acft)	Delta Volume (cf)
10 Year, 1 Hr	15.103	0.4054	26.935	0.4186	11.8	0.0132	575
10 Year, 3 Hr	7.225	0.5416	12.112	0.5811	4.89	0.0395	1,721
10 Year, 6 Hr	5.307	0.474	8.938	0.5537	3.63	0.0797	3,472
10 Year, 24 Hr	2.319	0.8634	3.882	1.09	1.56	0.2253	9,814

Preliminary Basin design suggest the need for an above ground detention basin, with a minimum volume of 32,243 cuft.
Basin to be refined in final engineering, where an outlet will be designed to reduce peak outflow rates from basin.

Basin A - Depth-Storage Table				
Elev (ft)	Area (sf)	Depth (ft)	Inc. Vol (cuft)	Cum Vol (cuft)
2,299.00	642.88	-	-	-
2,299.10	1,554.61	0.10	109.87	109.87
2,299.20	1,650.04	0.20	160.23	270.11
2,299.30	1,746.66	0.30	169.84	439.94
2,299.40	1,844.45	0.40	179.56	619.50
2,299.50	1,943.42	0.50	189.39	808.89
2,299.60	2,043.56	0.60	199.35	1,008.24
2,299.70	2,144.89	0.70	209.42	1,217.66
2,299.80	2,247.38	0.80	219.61	1,437.28
2,299.90	2,351.02	0.90	229.92	1,667.20
2,300.00	2,455.82	1.00	240.34	1,907.54
2,300.10	2,561.78	1.10	250.88	2,158.42
2,300.20	2,668.90	1.20	261.53	2,419.95
2,300.30	2,777.18	1.30	272.30	2,692.26
2,300.40	2,886.61	1.40	283.19	2,975.45
2,300.50	2,997.19	1.50	294.19	3,269.64
2,300.60	3,108.73	1.60	305.30	3,574.93
2,300.70	3,221.17	1.70	316.50	3,891.43
2,300.80	3,334.51	1.80	327.78	4,219.21
2,300.90	3,448.74	1.90	339.16	4,558.37
2,301.00	3,563.86	2.00	350.63	4,909.00
2,301.10	3,679.88	2.10	362.19	5,271.19
2,301.20	3,796.80	2.20	373.83	5,645.02
2,301.30	3,914.61	2.30	385.57	6,030.60
2,301.40	4,033.30	2.40	397.40	6,427.99
2,301.50	4,152.79	2.50	409.30	6,837.30
2,301.60	4,273.08	2.60	421.29	7,258.59
2,301.70	4,394.16	2.70	433.36	7,691.95
2,301.80	4,516.04	2.80	445.51	8,137.46
2,301.90	4,638.72	2.90	457.74	8,595.20
2,302.00	4,762.19	3.00	470.05	9,065.25
2,302.10	4,886.46	3.10	482.43	9,547.68
2,302.20	5,011.46	3.20	494.90	10,042.57
2,302.30	5,137.01	3.30	507.42	10,550.00
2,302.40	5,263.11	3.40	520.01	11,070.00
2,302.50	5,389.77	3.50	532.64	11,602.65
2,302.60	5,516.98	3.60	545.34	12,147.99
2,302.70	5,644.75	3.70	558.09	12,706.07

2,302.80	5,773.06	3.80	570.89	13,276.96
2,302.90	5,901.93	3.90	583.75	13,860.71
2,303.00	6,031.35	4.00	596.66	14,457.38
2,303.10	6,161.27	4.10	609.63	15,067.01
2,303.20	6,291.67	4.20	622.65	15,689.65
2,303.30	6,422.53	4.30	635.71	16,325.36
2,303.40	6,553.87	4.40	648.82	16,974.18
2,303.50	6,685.66	4.50	661.98	17,636.16
2,303.60	6,817.93	4.60	675.18	18,311.34
2,303.70	6,950.67	4.70	688.43	18,999.77
2,303.80	7,083.87	4.80	701.73	19,701.50
2,303.90	7,217.54	4.90	715.07	20,416.57
2,304.00	7,351.67	5.00	728.46	21,145.03
2,304.10	7,486.28	5.10	741.90	21,886.93
2,304.20	7,621.35	5.20	755.38	22,642.31
2,304.30	7,756.89	5.30	768.91	23,411.22
2,304.40	7,892.90	5.40	782.49	24,193.71
2,304.50	8,029.37	5.50	796.11	24,989.82
2,304.60	8,166.31	5.60	809.78	25,799.61
2,304.70	8,303.72	5.70	823.50	26,623.11
2,304.80	8,441.60	5.80	837.27	27,460.37
2,304.90	8,579.95	5.90	851.08	28,311.45
2,305.00	8,718.76	6.00	864.94	29,176.39

APPENDIX B: HYDRAULIC CALCULATIONS

- Storm Drain Line A Hydraulics
- Curb Inlet “A” in Sag Hydraulics
- Riprap Standard Detail Design – Std No. 314
- Trash Capture Detail – Std No. 313
- Trash Capture Bypass Check

Hydraulic Analysis Report

Project Data

Project Title: Hydraulic Design Structures

Designer:

Project Date: Monday, August 4, 2025

Project Units: U.S. Customary Units

Notes:

Channel Analysis: Line A & C

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter 1.00 ft

Longitudinal Slope: 0.1500 ft/ft

Manning's n: 0.0120

Flow 7.4500 cfs

Result Parameters

Depth 0.4990 ft

Area of Flow 0.3917 ft²

Wetted Perimeter 1.5689 ft

Hydraulic Radius 0.2497 ft

Average Velocity 19.0179 ft/s

Top Width 1.0000 ft

Froude Number: 5.3547

Critical Depth 0.9805 ft

Critical Velocity 9.5295 ft/s

Critical Slope: 0.0334 ft/ft

Critical Top Width 0.28 ft

Calculated Max Shear Stress 4.6710 lb/ft²

Calculated Avg Shear Stress 2.3371 lb/ft²

Curb and Gutter Analysis: Curb Inlet in Sag

Notes:

Gutter Input Parameters

Longitudinal Slope of Road: 0.0000 ft/ft

Cross-Slope of Pavement: 0.0200 ft/ft

Uniform Gutter Geometry

Manning's n: 0.0150

Gutter Width: 2.0000 ft

Gutter Result Parameters

Design Flow: 7.4500 cfs

Gutter Result Parameters

Width of Spread: 13.1200 ft

Gutter Depression: 0.0000 in

Area of Flow: 1.7214 ft²

Eo (Gutter Flow to Total Flow): 0.3570

Gutter Depth at Curb: 3.1488 in

Inlet Input Parameters

Inlet Location: Inlet in Sag

Percent Clogging: 0.0000 %

Inlet Type: Curb Opening

Length of Inlet: 14.0000 ft

Curb opening height: 6.0000 in

Local Depression: 3.0000 in

Inlet Result Parameters

Perimeter: 14.0000 ft

Effective Perimeter: 14.0000 ft

Area: 10.5000 ft²

Effective Area: 10.5000 ft²

Depth at curb face (upstream of local depression): 0.3157 ft

Computed Width of Spread at Sag: 15.7849 ft

Flow type: Weir Flow

Efficiency: 1.0000

Channel Analysis: Line B

Notes:

Input Parameters

Channel Type: Circular

Pipe Diameter 1.50 ft

Longitudinal Slope: 0.0200 ft/ft

Manning's n: 0.0120

Flow 9.0300 cfs

Result Parameters

Depth 0.8036 ft

Area of Flow 0.9639 ft²

Wetted Perimeter 2.4635 ft

Hydraulic Radius 0.3913 ft

Average Velocity 9.3684 ft/s

Top Width 1.4962 ft

Froude Number: 2.0569

Critical Depth 1.1624 ft

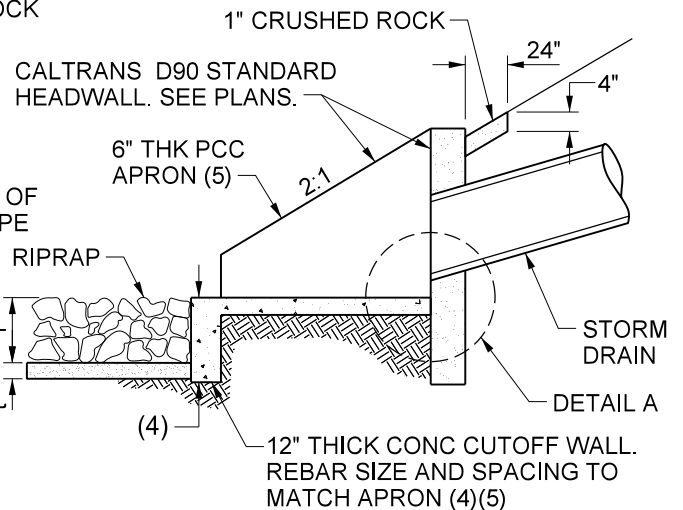
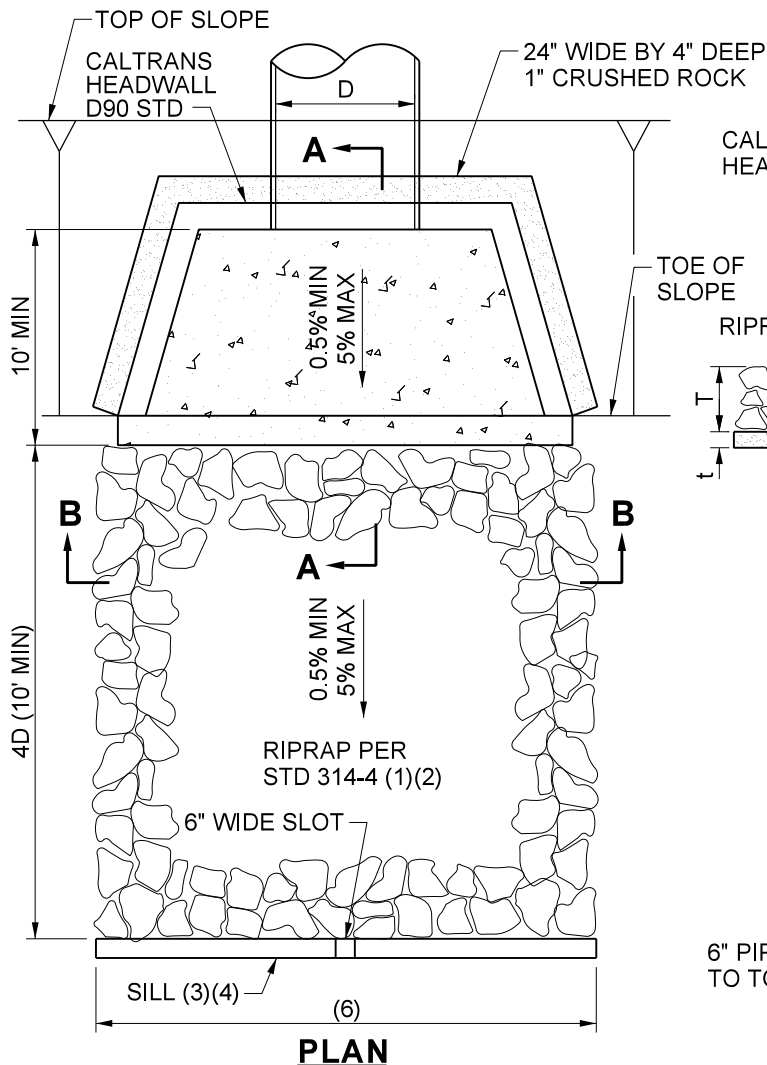
Critical Velocity 6.1456 ft/s

Critical Slope: 0.0070 ft/ft

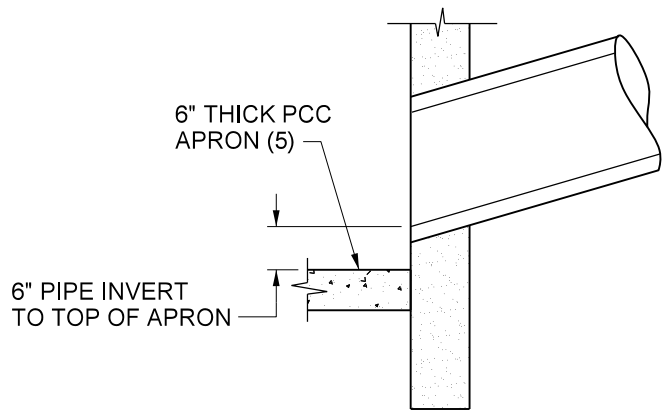
Critical Top Width 1.25 ft

Calculated Max Shear Stress 1.0029 lb/ft²

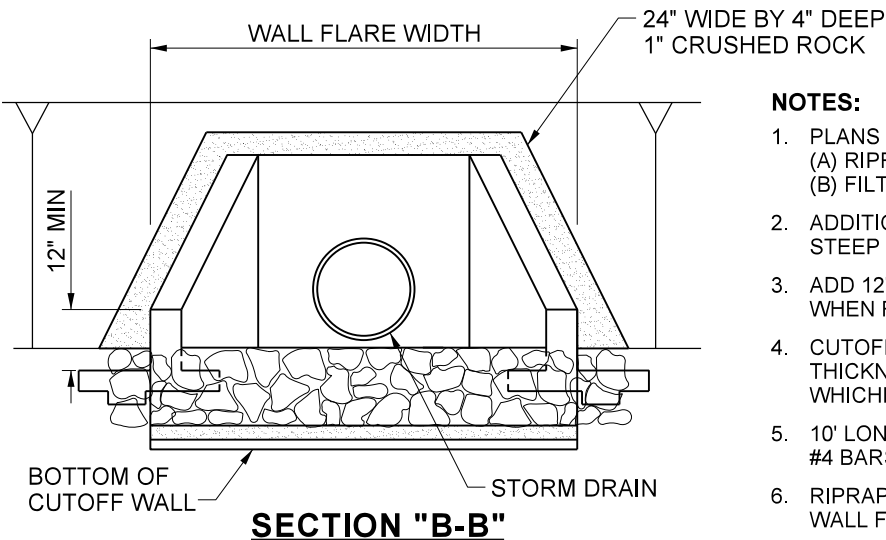
Calculated Avg Shear Stress 0.4883 lb/ft²



SECTION "A-A"



DETAIL A



NOTES:

1. PLANS SHALL SPECIFY FOR THIS STANDARD:
(A) RIPRAP CLASS AND THICKNESS (T)
(B) FILTER BLANKET MATERIAL AND THICKNESS (t).
2. ADDITIONAL RIPRAP MAY BE NECESSARY FOR STEEP APPLICATIONS (> 5%).
3. ADD 12" THICK CONCRETE SILL WHEN D>36", OR WHEN REQUIRED BY THE ENGINEER - SEE STD 314-4.
4. CUTOFF WALL AND SILL DEPTH TO BE 4" OR RIPRAP THICKNESS (T) PLUS FILTER THICKNESS (t) WHICHEVER IS GREATER.
5. 10' LONG (MIN) BY 6" THICK CONCRETE APRON WITH #4 BARS AT 18" OC.
6. RIPRAP PAD WIDTH TO BE THE GREATER OF THE WALL FLARE WIDTH OR 10'.

NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.

11/30/22
DATE

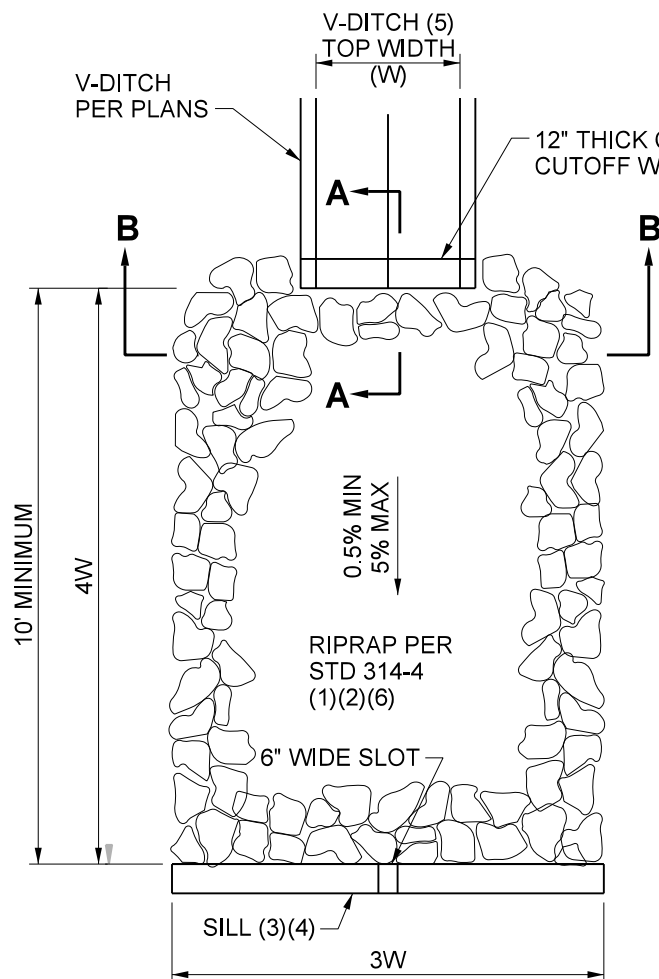
REVISION	DESCRIPTION	MARK	DATE	APPROVED



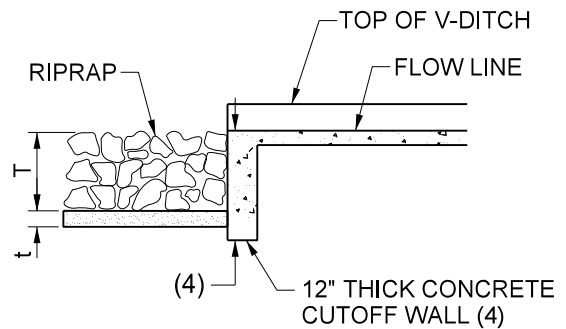
COUNTY OF RIVERSIDE

**RIPRAP ENERGY DISSIPATOR
AND APRON AT WINGWALL
STORM DRAIN OUTFALL**

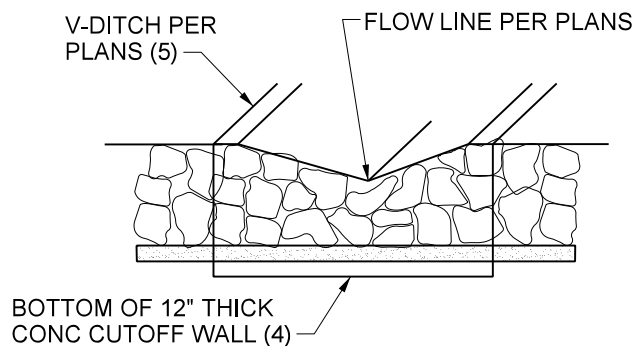
STANDARD No. 314 (1 OF 4)



PLAN



SECTION "A-A"



SECTION "B-B"

NOTES:

1. PLANS SHALL SPECIFY FOR THIS STANDARD:
(A) RIPRAP CLASS AND THICKNESS (T)
(B) FILTER BLANKET MATERIAL AND THICKNESS (t).
2. ADDITIONAL RIPRAP MAY BE NECESSARY FOR
STEEP APPLICATIONS (> 5%).
3. ADD 12" THICK CONCRETE SILL WHEN W>36", OR
WHEN REQUIRED BY THE ENGINEER - SEE STD 314-4.
4. CUTOFF WALL AND SILL DEPTH TO BE 4' OR RIPRAP
THICKNESS (T) PLUS FILTER THICKNESS (t)
WHICHEVER IS GREATER.
5. DETAIL MAY BE UTILIZED FOR CIRCULAR CONCRETE
DITCH ALSO.
6. FOR 3' WIDE DITCH AT SLOPE OF <5% AND A FLOW
RATE < 3.0 CFS, ENERGY DISSIPATOR MAY BE 6' BY 6'
No. 2 BACKING PER STD 314-4.

NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.

11/30/22
DATE

REVISION	DESCRIPTION	MARK	DATE	APPROVED



COUNTY OF RIVERSIDE

**RIPRAP ENERGY
DISSIPATOR AT
V-DICTH OUTFALL**

STANDARD No. 314 (2 OF 4)

RIPRAP ENERGY DISSIPATER SIZING TABLE

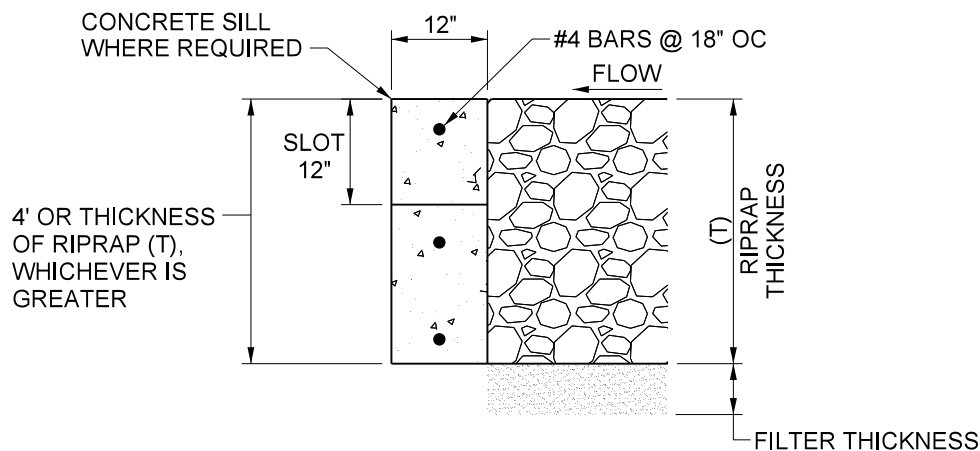
DESIGN VELOCITY (FT/SEC)	RIPRAP CLASS	RIPRAP THICKNESS (T) PLACEMENT METHOD A *	RIPRAP THICKNESS (T) PLACEMENT METHOD B *	FILTER MATERIAL **	FILTER THICKNESS (t)
6-8	NO. 2 BACKING	N/A	1.25'	1" CRUSHED ROCK	0.5'
8-13	1/4 TON	N/A	3.3'	1" CRUSHED ROCK	0.75'
13-15	1/2 TON	3.4'	4.3'	1" CRUSHED ROCK	1.0'
15-17	1 TON	4.3'	5.4'	1" CRUSHED ROCK	1.0'
17-20	2 TON	5.4'	N/A	1" CRUSHED ROCK	1.0'

* FOR RIPRAP GRADATION AND PLACEMENT METHOD DESCRIPTIONS
SEE CALTRANS STD SPECIFICATIONS SECTION 72-2

** SEE 1" CRUSHED ROCK GRADATION THIS SHEET

1" CRUSHED ROCK GRADATION

SIEVE SIZE	PERCENT (%) PASSING
1-1/2" (37.5 mm)	100
1" (25.0 mm)	90-100
3/4" (19.0 mm)	30-60
1/2" (12.5 mm)	0-20
3/8" (9.5 mm)	-
No. 4 (4.75 mm)	0-5
No. 8 (2.36 mm)	-
ASTM C131 Testing Grading	A



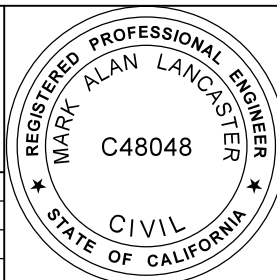
NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

11/30/22
DATE

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.

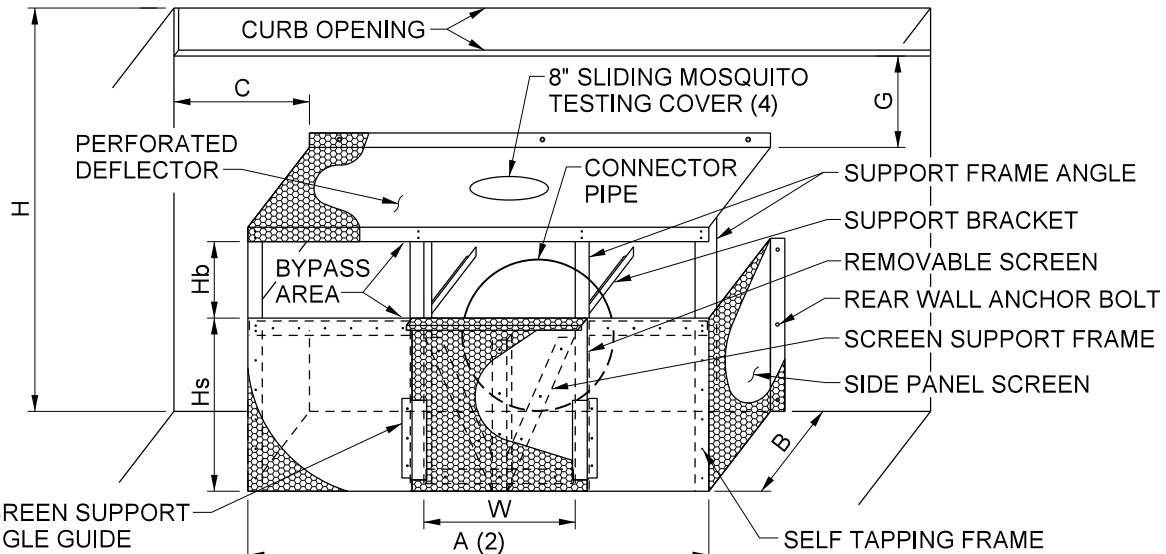


COUNTY OF RIVERSIDE

**RIPRAP ENERGY
DISSIPATOR SIZING
AND CONCRETE SILL**

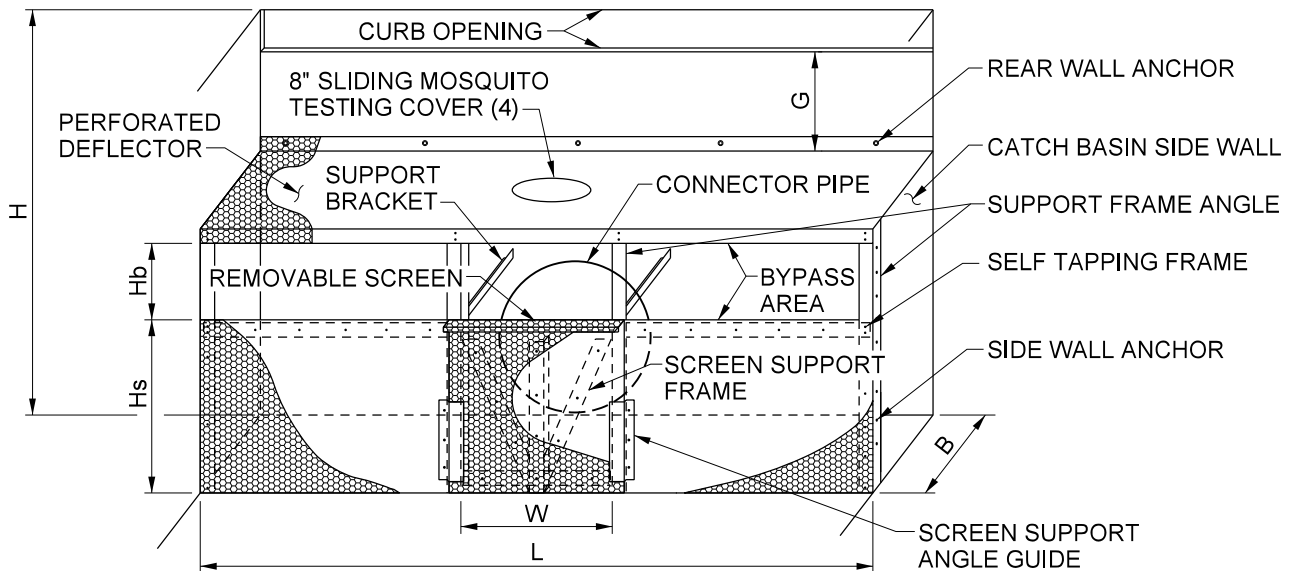
STANDARD No. 314 (4 OF 4)

REVISION	DESCRIPTION	MARK	DATE	APPROVED



L = A+2B (FOR
TYPE A ONLY)

TYPE A (BACK WALL MOUNT)



TYPE B (SIDE WALL MOUNT)

DIMENSIONS:

SCREEN LENGTH (1)	L
REMOVABLE SCREEN WIDTH (2)	W (24" TO 36")
SCREEN HEIGHT (1)	Hs
SCREEN BYPASS HEIGHT (1)	Hb
MINIMUM WALL CLEARANCE (2)	C = 12"
MINIMUM INTERIOR SPACE (2)	B = 10"
DISTANCE BELOW GUTTER FL (1)	G
CATCH BASIN HEIGHT (5)	H

NOTES:

1. SEE TABLES ON PAGES 10-13 FOR VALUES.
2. SEE FTCD GENERAL NOTES ON STANDARD 313-3.
3. SEE FTCD SCREEN TYPE AND LOCATIONS WITHIN CATCH BASINS ON STANDARD 313-4 TO 313-8.
4. MOSQUITO TESTING COVER REQUIRED ONLY FOR STANDARD No. 301 AND 302 APPLICATIONS.
5. CB HEIGHT IS VERTICAL DISTANCE FROM TOP OF CURB TO OUTLET PIPE FLOW LINE.

NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.

11/30/22
DATE



COUNTY OF RIVERSIDE

**FULL TRASH CAPTURE
DEVICE (FTCD) -
CONNECTOR
PIPE SCREEN (CPS)**

STANDARD No. 313 (1 OF 14)

REVISION	DESCRIPTION	MARK	DATE	APPROVED

FTCD SPECIFICATIONS

1. FULL TRASH CAPTURE DEVICE (FTCD) SHALL BE A UNITED STORM WATER, INC. CONNECTOR PIPE SCREEN (CPS) OR EQUIVALENT. EQUIVALENT SYSTEMS OR ALTERNATIVE DESIGNS SHALL BE ON THE STATE OF CALIFORNIA APPROVED TRASH CAPTURE DEVICE LIST AND REQUIRE APPROVAL OF THE TRANSPORTATION DEPARTMENT.
2. FTCD SHALL HAVE STRUCTURAL FRAME FOR STIFFNESS AND TO ENABLE BOLTING TO CATCH BASIN FLOOR AND WALL. FRAME MEMBERS SHALL BE FABRICATED FROM PERFORATED 14 GAUGE GRADE 304 STAINLESS STEEL HAVING 5 MM DIAMETER HOLES.
3. FTCD SCREENS SHALL BE FABRICATED FROM PERFORATED 14 GAUGE GRADE 304 STAINLESS STEEL HAVING 5 MM DIAMETER HOLES.
4. FTCD SHALL HAVE A PERFORATED DEFLECTOR SCREEN COVERING THE TOP OF THE FTCD TO PROHIBIT DEBRIS FROM FALLING BEHIND THE FRONT AND SIDE SCREENS. THE DEFLECTOR SHALL BE ABLE TO WITHSTAND A VERTICAL LOAD OF 10 LBS PER SQUARE FOOT.
5. FTCD FRAME AND SCREEN SHALL HAVE SUFFICIENT STRUCTURAL INTEGRITY TO WITHSTAND THE FORCE OF STANDING WATER IN THE CATCH BASIN ASSUMING THE SCREEN IS 100% CLOGGED.
6. FTCD SHALL BE FASTENED TO THE CATCH BASIN WALLS AND FLOOR WITH ANCHOR BOLTS. ANCHOR BOLTS SHALL BE SS-304, 3/8" DIAMETER AND 3" LENGTH, AND SHALL BE EPOXY SET INTO CATCH BASIN CONCRETE. IF REINFORCEMENT STEEL IS ENCOUNTERED DURING INSTALLATION, RELOCATE THE ANCHOR HOLE AND FILL VACANT HOLE WITH EPOXY. EPOXY SHALL BE ON THE CURRENT APPROVED LIST OF CHEMICAL ADHESIVES FOR USE IN CALTRANS CONTRACTS. ANCHOR BOLT SPACING TO BE 12" O.C. EXCEPT WHERE FRAME LENGTH WOULD RESULT IN LESS THAN 3 BOLTS PER FRAME MEMBER. IN THIS CASE FASTEN FRAME TO CATCH BASIN WALL USING 3 ANCHOR BOLTS.
7. THE SCREEN SHALL BE SECURED TO THE SUPPORT FRAME, BRACKETS AND SIDE PANEL USING #12 x 0.5" SELF TAPPING SS-304 TECH SCREWS .
8. THE FTCD SHALL BE FABRICATED ON SITE TO BE FLUSH WITH THE INTERIOR SURFACES OF THE CATCH BASIN. THE MAXIMUM ALLOWABLE GAP BETWEEN THE FTCD AND THE CATCH BASIN SURFACES IS 5MM (0.197 INCHES).
9. FOR SCREEN SPANS (DIMENSION "A" FOR TYPE A OR DIMENSION "L" FOR TYPE B PER STANDARD 313-1) GREATER THAN 36" PROVIDE ADDITIONAL SUPPORT BRACKETS AND SUPPORT FRAME ANGLES AT 36" ON CENTER OR LESS. SEE STANDARD 313-1 TYPE B FOR TYPICAL SUPPORT BRACKET AND SUPPORT FRAME ANGLE CONFIGURATION.

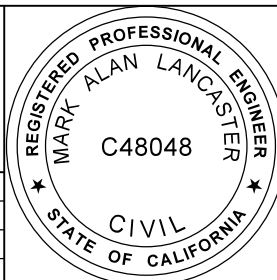
NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

11/30/22
DATE

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.



COUNTY OF RIVERSIDE

**FTCD - CPS
SPECIFICATIONS**

STANDARD No. 313 (2 OF 14)

REVISION	DESCRIPTION	MARK	DATE	APPROVED

FTCD GENERAL NOTES (NEW CONSTRUCTION)

1. FTCD SHALL CONFORM TO THE CONFIGURATIONS SHOWN IN STANDARD 313-4 THROUGH 313-8 AND SHALL BE SIZED ACCORDING TO THE SIZING TABLES SHOWN IN STANDARD 313-10 THROUGH 313-13.
2. THE REMOVABLE SCREEN WIDTH (W) SHALL EQUAL THE CONNECTOR PIPE DIAMETER OR 24", WHICHEVER IS GREATER, BUT SHALL NOT EXCEED 36". WHERE DIMENSION "A" PER STANDARD 313-1 TYPE A (BACK WALL MOUNT) IS LESS THAN OR EQUAL TO 36", THE REMOVABLE SCREEN MAY EXTEND THE FULL WIDTH OF THE FTCD (W = A). IN THIS CASE SUPPORT BRACKETS AND THE ASSOCIATED SUPPORT FRAME ANGLES WILL BE OMITTED.
3. IF THE FTCD CANNOT PROVIDE A SIDE WALL CLEARANCE (C) OF 12", PROVIDE A SIDE WALL MOUNT. AN L-SHAPED FTCD WILL HAVE ONE SIDE WALL AND ONE BACK WALL MOUNT.
4. THE INTERIOR SPACE DIMENSION "B" PER DRAWING 313-1 TYPE A, SHALL BE AT LEAST 10" UNLESS OTHERWISE AUTHORIZED BY THE TRANSPORTATION DEPARTMENT.
5. POSITIVE DRAINAGE TO THE OUTLET PIPE IS REQUIRED FOR THE ENTIRE CATCH BASIN FLOOR.
6. THE CATCH BASIN SHALL INCLUDE MAINTENANCE GAUGE STENCILING ON THE INTERIOR WALL OPPOSITE THE FTCD THAT IDENTIFIES THE ACCUMULATED DEBRIS ELEVATION AT 40% AND 100% OF THE FTCD HEIGHT. SEE STANDARD 313-9 FOR STENCILING REQUIREMENTS.
7. TRANSPORTATION DEPARTMENT APPROVAL REQUIRED WHERE CONNECTOR PIPE SIZE > 42" DIAMETER.
8. CATCH BASINS (NEW OR EXISTING) WITH FOSSIL FILTERS (PER STANDARD 300A OR EQUIVALENT) SHALL REQUIRE SPECIAL CONSIDERATION FOR INCORPORATION OF THE FTCD. A MODIFIED FTCD DESIGN SHALL BE SUBMITTED TO THE TRANSPORTATION DEPARTMENT FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
9. ENGINEER MAY PREPARE SITE SPECIFIC CPS DESIGN UTILIZING THE CPS FLOW CHART PER STANDARD 313-14 IN LIEU OF SIZING PER STANDARD 313-10 THROUGH 313-13.

FTCD RETROFIT NOTES

10. WHERE MANHOLE CONFIGURATIONS IN THE EXISTING CATCH BASIN DO NOT CONFORM WITH FTCD LOCATIONS SHOWN IN STANDARD 313-4 THROUGH 313-8, NEW MANHOLES OPENINGS SHALL BE INSTALLED TO CONFORM WITH THESE REQUIREMENTS. RETROFIT DESIGN DRAWINGS MUST BE APPROVED BY THE TRANSPORTATION DEPARTMENT.
11. IF ADEQUATE SPACE IS NOT AVAILABLE FOR RETROFIT OF EXISTING CATCH BASIN WITH FTCD, A MODIFIED FTCD DESIGN SHALL BE SUBMITTED TO THE TRANSPORTATION DEPARTMENT FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
12. CATCH BASINS THAT DO NOT DRAIN TOWARD THE CONNECTOR PIPE SHALL BE MODIFIED TO DRAIN PROPERLY UTILIZING A POLYESTER POLYMER CONCRETE OVERLAY PRODUCT APPROVED BY THE TRANSPORTATION DEPARTMENT PRIOR TO INSTALLATION OF THE FTCD. THE BASIN FLOOR SHALL BE ROUGHENED TO THE SATISFACTION OF THE TRANSPORTATION DEPARTMENT PRIOR TO APPLICATION OF THE OVERLAY. SURFACE PREPARATION MUST PROVIDE FOR MINIMUM OVERLAY THICKNESS PER OVERLAY PRODUCT MANUFACTURER'S SPECIFICATIONS. PROPER DRAINAGE OF BASIN FLOOR SHALL BE ACHIEVED TO THE SATISFACTION OF THE TRANSPORTATION DEPARTMENT.

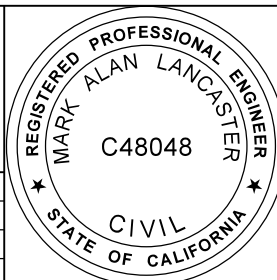
NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

11/30/22
DATE

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.

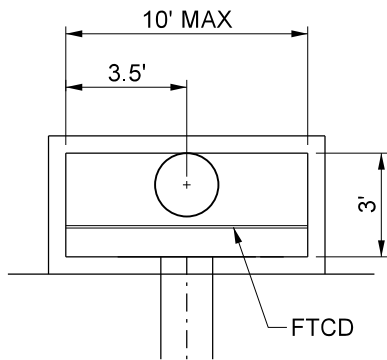


COUNTY OF RIVERSIDE

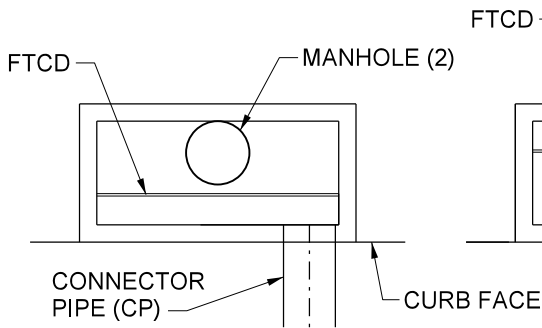
**FTCD - CPS
GENERAL NOTES AND
RETROFIT NOTES**

STANDARD No. 313 (3 OF 14)

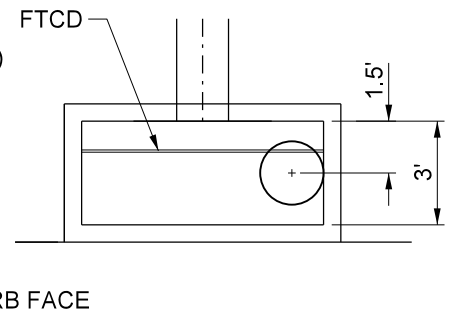
REVISION	DESCRIPTION	MARK	DATE	APPROVED



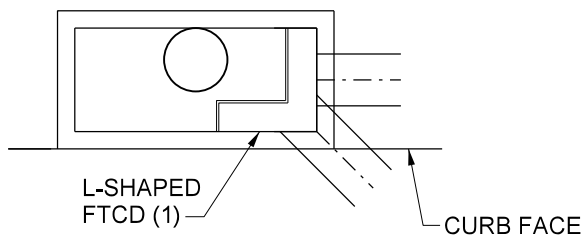
CENTERED CP



OFFSET CP



BACK WALL CP



SIDE OR CORNER CP (1)(3)

NOTES:

- (1) FOR CORNER AND SIDE CONNECTOR PIPE (CP) LOCATIONS THE FTCD SHALL BE L-SHAPED TO FULLY COVER THE PIPE OPENING. A SUPPORT FRAME ANGLE SHALL BE PROVIDED IN THE CPS CORNER.
- (2) DETAIL VALID FOR CATCH BASIN WIDTHS LESS THAN OR EQUAL TO 10 FEET. MULTIPLE MANHOLES REQUIRED FOR CATCH BASIN WIDTHS GREATER THAN 10 FEET. SEE STANDARD NO. 313-5 AND 313-6.
- (3) FOR SIDE OR CORNER CP LOCATIONS WHERE REQUIRED SCREEN LENGTH (L) CANNOT BE ACHIEVED SPECIAL DESIGN MUST BE SUBMITTED TO THE TRANSPORTATION DEPARTMENT FOR REVIEW AND APPROVAL.

NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.

11/30/22
DATE

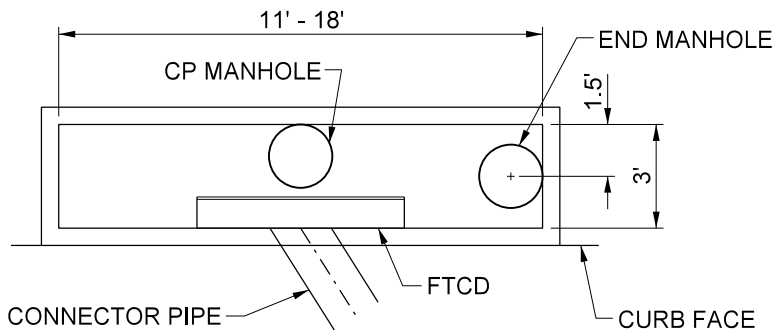


COUNTY OF RIVERSIDE

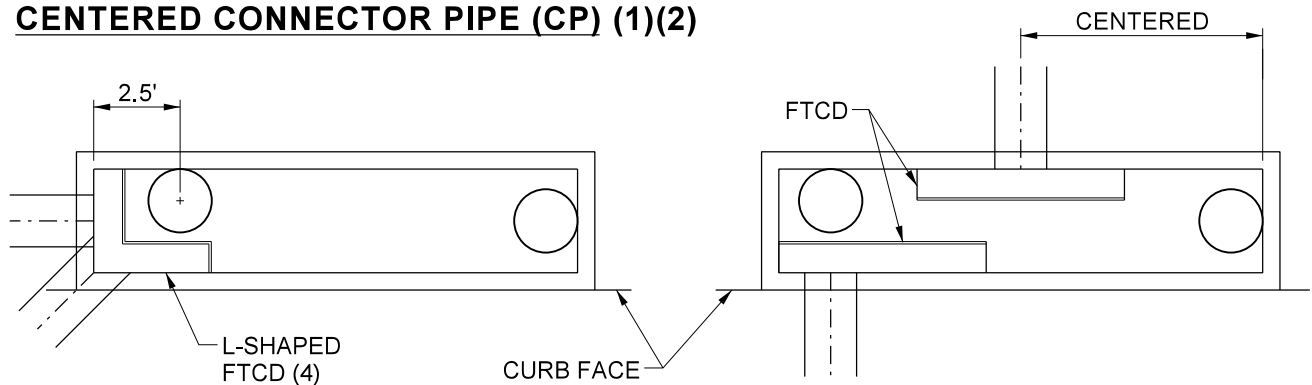
**FTCD - CPS SCREEN /
MANHOLE LOCATIONS FOR
10' MAX WIDTH STANDARD NO. 300
CURB INLET CATCH BASINS**

STANDARD No. 313 (4 OF 14)

REVISION	DESCRIPTION	MARK	DATE	APPROVED



CENTERED CONNECTOR PIPE (CP) (1)(2)



SIDE OR CORNER CP (4)(5)

OFFSET OR BACK WALL CP (1)(3)

NOTES:

- (1) FOR CONNECTOR PIPE EXITING TOWARD STREET CENTERLINE, LOCATE CONNECTOR PIPE (CP) MANHOLE ALONG BACK WALL OPPOSITE OF CP CENTERLINE. LOCATE END MANHOLE AT EITHER END WHEN CP IS CENTERED IN CATCH BASIN, OR ON OPPOSITE SIDE OF CP WHEN CP IS ON EITHER SIDE OF CATCH BASIN CENTERLINE.
- (2) SHALLOW CATCH BASINS WITH A HEIGHT (H) LESS THAN 3.5' SHALL INCLUDE A THIRD MANHOLE ON THE OPPOSITE SIDE OF THE CONNECTOR PIPE FROM THAT SHOWN PLACED AGAINST THE END WALL.
- (3) CONNECTOR PIPE EXITING THROUGH BACK WALL OF CATCH BASIN MUST BE CENTERED IN CATCH BASIN UNLESS APPROVED BY THE TRANSPORTATION DEPARTMENT.
- (4) FOR CORNER AND SIDE CONNECTOR PIPE (CP) LOCATIONS, THE FTCD SHALL BE L-SHAPED TO FULLY COVER THE PIPE OPENING. A SUPPORT FRAME ANGLE SHALL BE PROVIDED IN THE CPS CORNER.
- (5) FOR SIDE OR CORNER CP LOCATIONS WHERE REQUIRED SCREEN LENGTH (L) CANNOT BE ACHIEVED, SPECIAL DESIGN MUST BE SUBMITTED TO THE TRANSPORTATION DEPARTMENT FOR REVIEW AND APPROVAL.

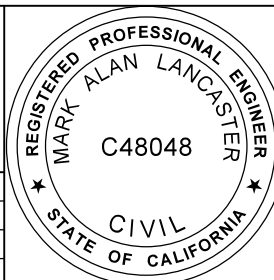
NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

11/30/22
DATE

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.

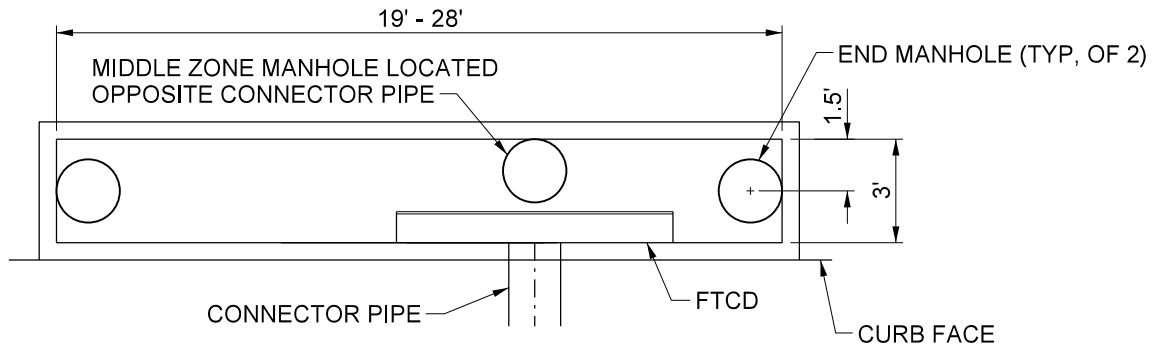


COUNTY OF RIVERSIDE

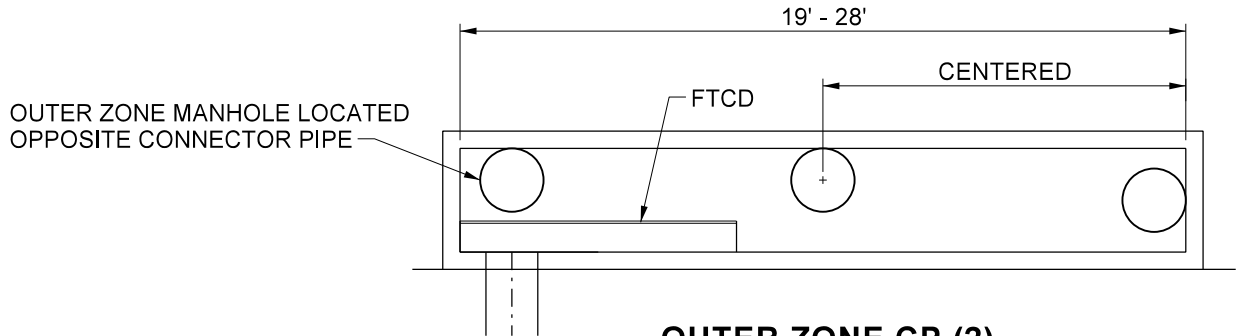
**FTCD - CPS SCREEN /
MANHOLE LOCATIONS FOR
11'-18' WIDTH STANDARD NO. 300
CURB INLET CATCH BASINS**

STANDARD No. 313 (5 OF 14)

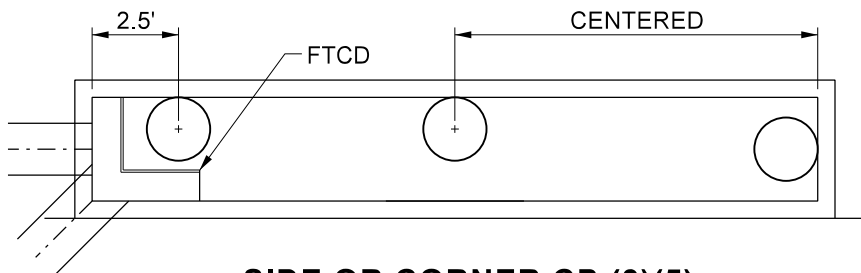
REVISION	DESCRIPTION	MARK	DATE	APPROVED



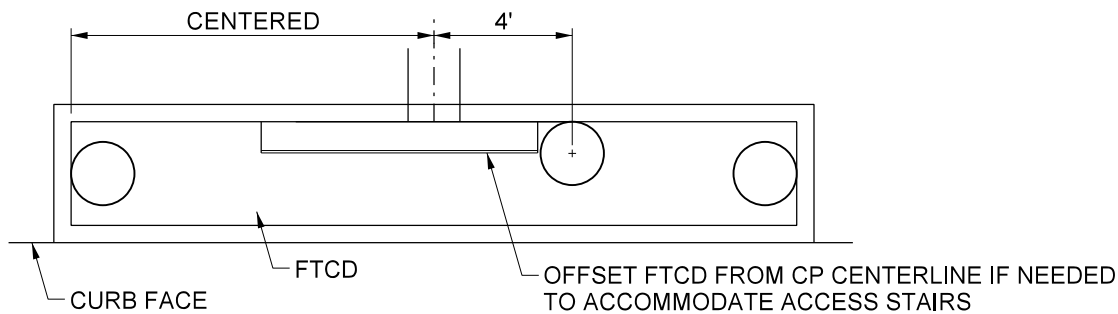
CENTERED OR MIDDLE ZONE CP (1)



OUTER ZONE CP (2)



SIDE OR CORNER CP (3)(5)



BACK WALL CP (4)

NOTE:
SEE STANDARD NO. 313-7
FOR REFERENCED NOTES.

NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.

11/30/22
DATE



COUNTY OF RIVERSIDE

**FTCD - CPS SCREEN /
MANHOLE LOCATIONS FOR
19'-28' WIDTH STANDARD NO. 300
CURB INLET CATCH BASINS**

STANDARD No. 313 (6 OF 14)

REVISION	DESCRIPTION	MARK	DATE	APPROVED

NOTES: (FOR STANDARD NO. 313-6)

- (1) FOR CONNECTOR PIPE EXITING TOWARD STREET CENTERLINE IN MIDDLE ZONE, LOCATE CONNECTOR PIPE (CP) MANHOLE ALONG BACK WALL OPPOSITE OF CP CENTERLINE. LOCATE END MANHOLES AT EITHER END OF CATCH BASIN AS SHOWN.
- (2) FOR CONNECTOR PIPE EXITING TOWARD STREET CENTERLINE IN OUTER ZONE, LOCATE OUTER ZONE MANHOLE ALONG BACK WALL OPPOSITE OF CP CENTERLINE. LOCATE ONE END MANHOLE ON THE OPPOSITE SIDE OF THE CB CENTERLINE FROM THE CP, AND ONE CENTERED MANHOLE ALONG THE CATCH BASIN BACK WALL.
- (3) FOR CORNER AND SIDE CONNECTOR PIPE (CP) LOCATIONS THE FTCD SHALL BE L-SHAPED TO FULLY COVER THE PIPE OPENING. A SUPPORT FRAME ANGLE SHALL BE PROVIDED IN THE CPS CORNER.
- (4) CONNECTOR PIPE EXITING THROUGH BACK WALL OF CATCH BASIN MUST BE CENTERED IN CATCH BASIN UNLESS APPROVED BY THE TRANSPORTATION DEPARTMENT.
- (5) FOR SIDE OR CORNER CP LOCATIONS WHERE REQUIRED SCREEN LENGTH (L) CANNOT BE ACHIEVED SPECIAL DESIGN MUST BE SUBMITTED TO THE TRANSPORTATION DEPARTMENT FOR REVIEW AND APPROVAL.

NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.

11/30/22
DATE

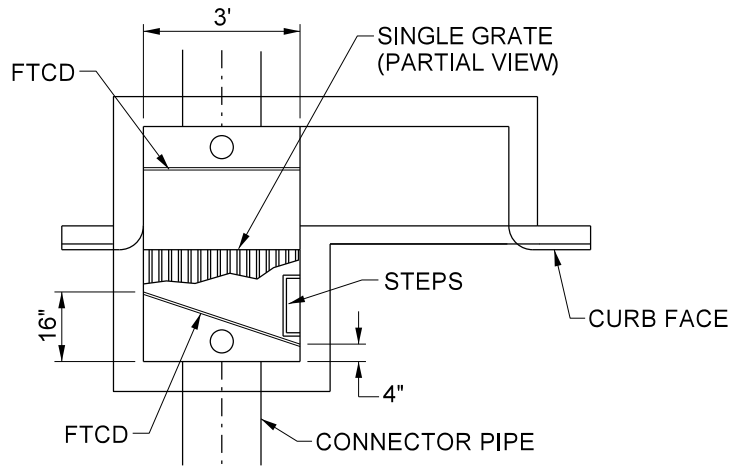


COUNTY OF RIVERSIDE

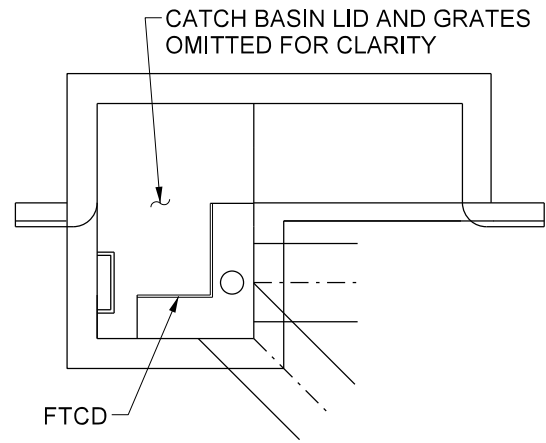
FTCD - CPS SCREEN /
MANHOLE LOCATIONS FOR
19'-28' WIDTH STANDARD NO. 300
CURB INLET CATCH BASINS

STANDARD No. 313 (7 OF 14)

REVISION	DESCRIPTION	MARK	DATE	APPROVED

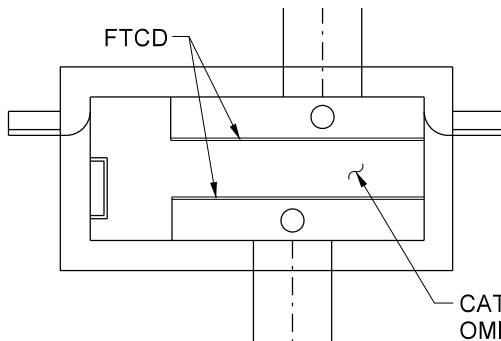


CENTERED OR BACK WALL CP (1)(5)

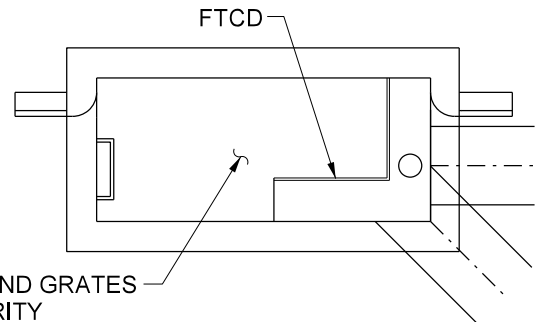


SIDE OR CORNER CP (2)(4)

CATCH BASIN 301



CENTERED OR BACK WALL CP (3)(5)



SIDE OR CORNER CP (2)(3)(4)

CATCH BASIN 302

NOTES:

- (1) WHEN STEPS OBSTRUCT THE STANDARD FTCD INSTALLATION, ANGLE THE SCREEN IN FRONT OF THE CONNECTOR PIPE TO AVOID THE STEPS AS SHOWN.
- (2) FOR CORNER AND SIDE CONNECTOR PIPE (CP) LOCATIONS, THE FTCD SHALL BE L-SHAPED TO FULLY COVER THE PIPE OPENING.
- (3) MULTIPLE GRATE CATCH BASIN WIDTH SHOWN. FOR SINGLE GRATE APPLICATIONS PLACE FTCD PER CATCH BASIN 301 DETAILS ABOVE.
- (4) FOR SIDE OR CORNER CP LOCATIONS WHERE REQUIRED SCREEN LENGTH (L) CANNOT BE ACHIEVED, SPECIAL DESIGN MUST BE SUBMITTED TO THE TRANSPORTATION DEPARTMENT FOR REVIEW AND APPROVAL.
- (5) INSTALL FTCD, TYPE B (SIDE WALL MOUNT), TO AVOID STEPS AS NECESSARY.

NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

11/30/22
DATE

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.

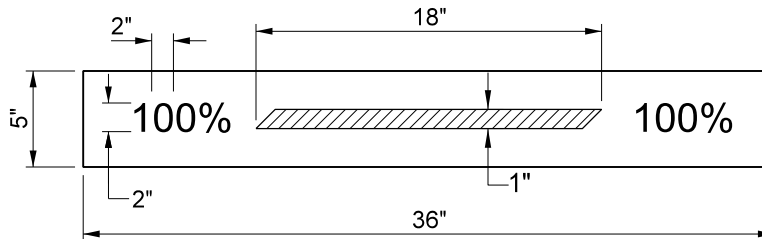


COUNTY OF RIVERSIDE

**FTCD - CPS SCREEN
LOCATIONS FOR STANDARD NO.
CB301 AND CB302 COMBINATION
INLET CATCH BASINS**

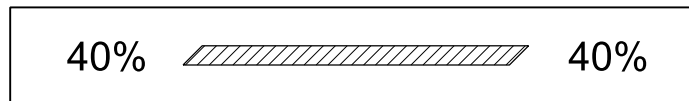
STANDARD No. 313 (8 OF 14)

REVISION	DESCRIPTION	MARK	DATE	APPROVED



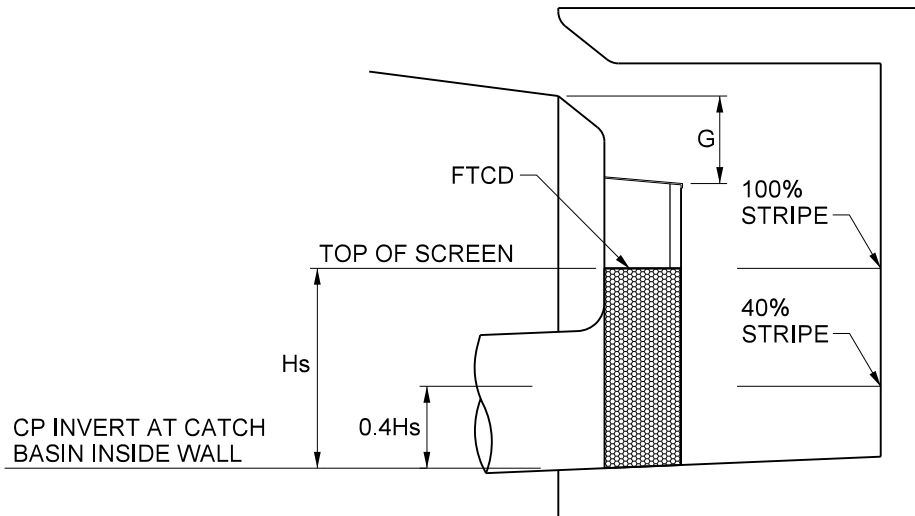
100% STRIPE

(RED STRIPES AND NUMBERS ON WHITE BACKGROUND)



40% STRIPE

(RED STRIPES AND NUMBERS ON WHITE BACKGROUND)



NOTES:

1. PAINT SHALL BE RED STRIPES AND NUMBERS ON WHITE BACKGROUND ON THE BACK WALL OF THE CATCH BASIN, LABELING 40% AND 100% SCREEN HEIGHT AS SHOWN ABOVE. PAINT SHALL BE WATERBORNE ACRYLIC AND REFLECTIVE.
2. SURFACES SHALL BE CLEAN, DRY AND FREE FROM ALL CONTAMINANTS PRIOR TO PAINTING.
3. STENCILING SHALL BE VISIBLE FROM THE STREET THROUGH CATCH BASIN OPENING.

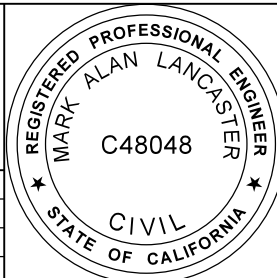
NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

11/30/22
DATE

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.



COUNTY OF RIVERSIDE

**FTCD - CPS
MAINTENANCE GAUGE**

STANDARD No. 313 (9 OF 14)

REVISION	DESCRIPTION	MARK	DATE	APPROVED

FTCD SIZING TABLE FOR STANDARD NO. 300 CURB INLET CATCH BASIN ON GRADE CONDITION

CATCH BASIN TYPE	H (FT)	CATCH BASIN WIDTH (FT) (1)	NUMBER OF GRATES	BYPASS HEIGHT H _b (IN)	SCREEN HEIGHT H _s (IN)	SCREEN LENGTH L (FT)	G (IN)
300	2.5 (30 inches)	7.0	-	8.0	8.0	7.0	4.0
		10.0				7.0	
		14.0				10.0	
	2.67 (32 inches)	7.0	-	8.0	10.0	7.0	4.0
		10.0				7.0	
		14.0				10.0	
	2.83 (34 inches)	7.0	-	8.0	12.0	7.0	4.0
		10.0				7.0	
		14.0				10.0	
		21.0				11.0	
	3.0	7.0	-	8.0	12.0	4.0	6.0
		10.0		8.0	14.0	6.0	
		14.0				10.0	4.0
		21.0				14.0	
		28.0				18.0	
	3.5	7.0	-	8.0	18.0	4.0	6.0
		10.0		10.0	16.0	6.0	
		14.0				6.0	
		21.0				7.0	
		28.0				9.0	
	4.0	7.0	-	12.0	20.0	4.0	6.0
		10.0				6.0	
		14.0				6.0	
		21.0				7.0	
		28.0				8.0	
	4.5 OR GREATER	7.0	-	12.0	24.0	4.0	8.0
		10.0				6.0	
		14.0				6.0	
		21.0				7.0	
		28.0				8.0	

NOTES:

- FOR CATCH BASIN WIDTHS NOT SHOWN USE NEXT HIGHER VALUE.
- WHERE THE SCREEN LENGTH (L) IS EQUAL TO THE CATCH BASIN WIDTH, THE CPS SHALL BE THE FULL WIDTH OF THE CATCH BASIN AND UTILIZE A SIDE WALL MOUNT.

NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF: 11/30/22 DATE DIRECTOR OF TRANSPORTATION MARK LANCASTER, P.E.				COUNTY OF RIVERSIDE FTCD - CPS SIZING TABLE FOR STANDARD NO. 300 CURB INLET CATCH BASIN ON GRADE CONDITION		
REVISION	DESCRIPTION	MARK	DATE	APPROVED	STANDARD No. 313 (10 OF 14)	

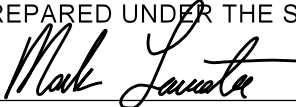
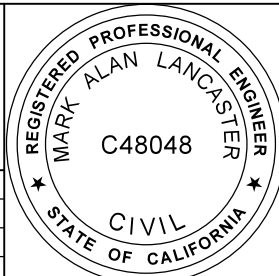
**FTCD SIZING TABLE FOR STANDARD NO. 301 AND 302 COMBINATION
INLET CATCH BASIN ON GRADE CONDITION**

CATCH BASIN TYPE	H (FT)	CATCH BASIN WIDTH (FT) (1)	NUMBER OF GRATES	BYPASS HEIGHT H _b (IN)	SCREEN HEIGHT H _s (IN)	SCREEN LENGTH L (FT)	G (IN)
301	3.0	7.0	1	8.0	10.0	4.0	10.0
		10.0	2			7.0	
		14.0	1			8.0	
		14.0	2			8.0	
	3.5	7.0	1	10.0	12.0	6.0	12.0
		10.0	2			5.0	
		14.0	1			5.0	
		14.0	2			6.0	
	4.0	7.0	1	12.0	15.0	4.0	13.0
		10.0	2			5.0	
		14.0	1			4.0	
		14.0	2			5.0	
	4.5 OR GREATER	7.0	1	12.0	18.0	4.0	16.0
		10.0	2			5.0	
		14.0	1			4.0	
		14.0	2			5.0	
302	3.0	-	1	9.0	9.0	3.0	10.0
		-	2			5.0	
		-	3			6.0	
	3.5	-	1	10.0	12.0	2.5	12.0
		-	2			4.0	
		-	3			5.0	
	4.0 OR GREATER	-	1	10.0	18.0	2.5	12.0
		-	2			4.0	
		-	3			5.0	

NOTES:

1. FOR CATCH BASIN WIDTHS NOT SHOWN USE NEXT HIGHER VALUE.

NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:  11/30/22 DATE DIRECTOR OF TRANSPORTATION MARK LANCASTER, P.E.					COUNTY OF RIVERSIDE FTCD - CPS SIZING TABLE FOR STANDARD NO. 301 AND 302 COMBINATION INLET CATCH BASIN ON GRADE CONDITION	
REVISION	DESCRIPTION	MARK	DATE		APPROVED	STANDARD No. 313 (11 OF 14)

FTCD SIZING TABLE FOR STANDARD NO. 300 CURB INLET CATCH BASIN SUMP CONDITION

CATCH BASIN TYPE	H (FT)	CATCH BASIN WIDTH (FT) (1)	NUMBER OF GRATES	BYPASS HEIGHT H _b (IN)	SCREEN HEIGHT H _s (IN)	SCREEN LENGTH L (FT)	G (IN)
300	3.5	7.0	-	12.0	16.0	7.0	4.0
		10.0		14.0	14.0	6.0	
		14.0				7.0	
	4.0	7.0	-	16.0	18.0	7.0	4.0
		10.0				6.0	
		14.0				6.0	
		21.0		18.0	16.0	7.0	
		28.0				8.0	
	4.5	7.0	-	16.0	18.0	7.0	10.0
		10.0				6.0	
		14.0				6.0	
		21.0		18.0	16.0	7.0	
		28.0				8.0	
	5.0 OR GREATER	7.0	-	16.0	24.0	7.0	10.0
		10.0				6.0	
		14.0				6.0	
		21.0		18.0	20.0	7.0	12.0
		28.0				8.0	

NOTES:

- FOR CATCH BASIN WIDTHS NOT SHOWN USE NEXT HIGHER VALUE.

NOT TO SCALE

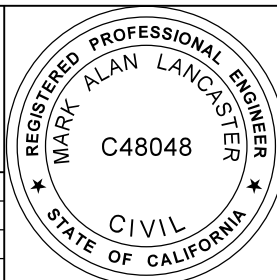
PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

11/30/22

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.

DATE



COUNTY OF RIVERSIDE

**FTCD - CPS SIZING TABLE
FOR STANDARD NO. 300
CURB INLET CATCH BASIN
SUMP CONDITION**

STANDARD No. 313 (12 OF 14)

REVISION	DESCRIPTION	MARK	DATE	APPROVED

**FTCD SIZING TABLE FOR STANDARD NO. 301 AND 302 COMBINATION
INLET CATCH BASIN SUMP CONDITION**

CATCH BASIN TYPE	H (FT)	CATCH BASIN WIDTH (FT) (1)	NUMBER OF GRATES	BYPASS HEIGHT H _b (IN)	SCREEN HEIGHT H _s (IN)	SCREEN LENGTH L (FT)	G (IN)
301	3.5	7.0	1	14.0	9.0	7.0	11.0
	4.0	7.0	1	16.0	11.0	5.0	13.0
		10.0	2			6.0	
	4.5	7.0	1	18.0	15.0	5.0	13.0
		10.0	2			6.0	
		14.0	1			5.0	
		14.0	2			6.0	
	5.0 OR GREATER	7.0	1	18.0	18.0	4.0	16.0
		10.0	2			6.0	
		14.0	1			5.0	
		14.0	2			6.0	
302	4.0	-	2	14.0	8.0	2.5	18.0
		-	3			6.0	
	4.5	-	1	16.0	8.0	2.5	22.0
		-	2	16.0	10.0	5.0	20.0
		-	3			7.0	
	5.0 OR GREATER	-	1	16.0	12.0	2.5	24.0
		-	2			5.0	
		-	3			7.0	

NOTES:

- FOR CATCH BASIN WIDTHS NOT SHOWN USE NEXT HIGHER VALUE.

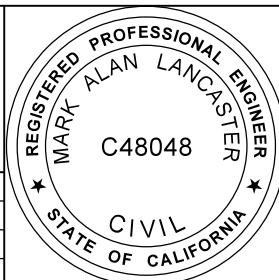
NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

11/30/22
DATE

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.

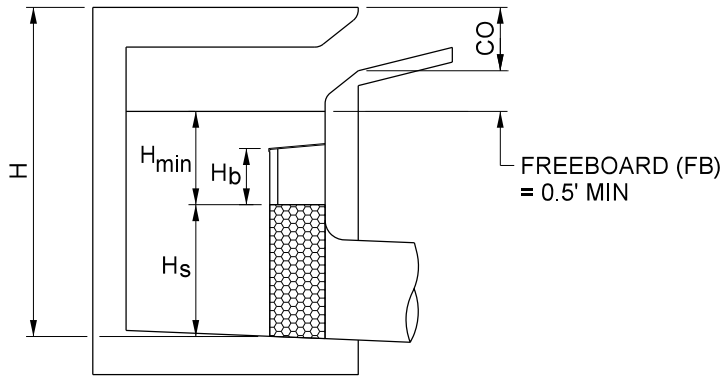


COUNTY OF RIVERSIDE

**FTCD - CPS SIZING TABLE FOR
STANDARD NO. 301 AND 302
COMBINATION INLET
CATCH BASIN
SUMP CONDITION**

STANDARD No. 313 (13 OF 14)

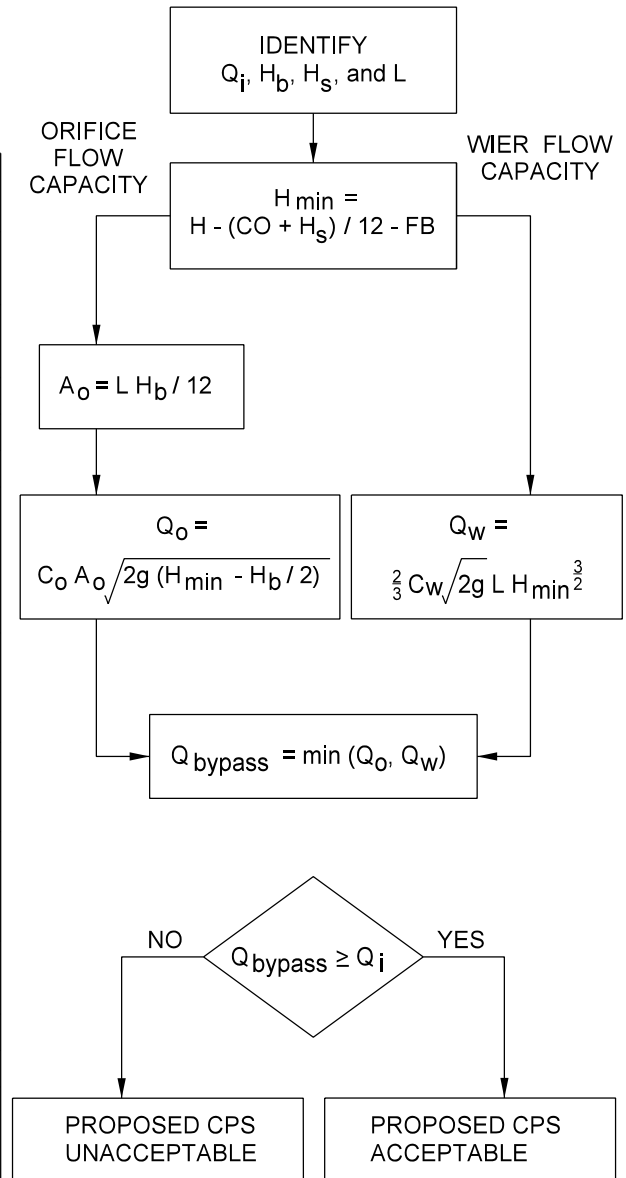
REVISION	DESCRIPTION	MARK	DATE	APPROVED



NOTE:

THE BELOW ANALYSIS ASSUMES THAT THE CONNECTOR PIPE SCREEN IS COMPLETELY CLOGGED AND ALL FLOW IS CONVEYED THROUGH THE BYPASS

VALUE	UNITS	DESCRIPTION
H	FT	HEIGHT OF CATCH BASIN, AS DEFINED IN STANDARDS NO. 300, 301 AND 302
H_{min}	FT	DEPTH FROM TOP OF SCREEN TO FREEBOARD
H_b	IN	BYPASS OPENING HEIGHT
H_s	IN	SCREEN HEIGHT
L	FT	BYPASS OPENING LENGTH
FREE-BOARD (FB)	FT	MINIMUM ALLOWABLE FREEBOARD (FB) IS 0.5' TO ENSURE THAT WATER LEVELS INSIDE THE CATCH BASIN DO NOT IMPAIR THE CATCH BASIN STREET INTERCEPTION CAPACITY
CO	IN	CURB OPENING HEIGHT (CO) IS DEFINED HERE AS THE HEIGHT FROM THE TOP OF CURB TO THE FLOW LINE OF THE INLET AT THE LOCAL DEPRESSION
Q_i	CFS	FLOW RATE INTERCEPTED BY THE INLET AS DETERMINED BY THE ENGINEER FOR SITE-SPECIFIC CONDITIONS
Q_o	CFS	BYPASS FLOW RATE UNDER ORIFICE FLOW CONDITION, ASSUMES THAT ENTIRE BYPASS OPENING FUNCTIONS AS A RECTANGULAR ORIFICE
Q_w	CFS	BYPASS FLOW RATE UNDER WEIR FLOW CONDITION
C_o	-	ORIFICE FLOW COEFFICIENT = 0.61
C_w	-	WEIR FLOW COEFFICIENT = 0.61
A_o	FT^2	BYPASS OPENING AREA FOR ORIFICE FLOW, ASSUMES THAT THE ENTIRE BYPASS OPENING FUNCTIONS AS A RECTANGULAR ORIFICE



NOT TO SCALE

PREPARED UNDER THE SUPERVISION OF:

Mark Lancaster

11/30/22

DIRECTOR OF TRANSPORTATION
MARK LANCASTER, P.E.

DATE



COUNTY OF RIVERSIDE

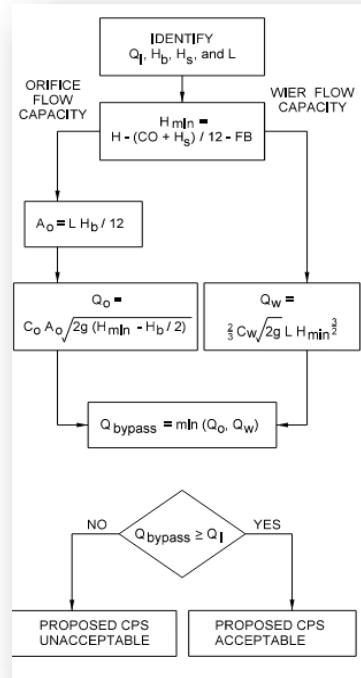
**FTCD - CPS
BYPASS CHECK
FLOW CHART**

STANDARD No. 313 (14 OF 14)

REVISION	DESCRIPTION	MARK	DATE	APPROVED

Standard No. 313 Bypass Check

Q: * 0.5 cfs
 Hb: 16 in
 Hs: 24 in
 L: 14 ft
 Co: 0.6
 Cw: 0.61
 CO: 9 in
 FB: 0.5 ft
 H: 5.5 ft



Hmin: 2.25 ft
 Ao: 18.66667 sqft
 Qo: 86 cfs
 Qw: 154 cfs
 Qbypass: 86 cfs

Qbypass > Qi? Yes

*Value per Preliminary WQMP Trash Capture Calculation

APPENDIX C: REFERENCE

- Riverside County Excerpt: Plate D-5.6 Impervious Cover for Developed Areas
- NOAA Atlas 14 Point Precipitation Frequency Estimates
- Riverside County Excerpt: Plate D-4.6 Slope of Intensity-Duration Curve
- Riverside County Excerpt: Plate D-5.5 Runoff Index for Pervious Areas
- Riverside County Excerpt: Plate D-3 Time of Concentration Nomograph
- Riverside County Excerpt: Plate D-4.7 Intensity-Duration Curves Sheet
- Riverside County Excerpt: Plate D-5.7 Runoff Coefficient Data
- FEMA Flood Hazard Map
- NRCS Soil Survey

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent (2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. ($\frac{1}{2}$ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.
2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.
3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

RCFC & WCD
HYDROLOGY MANUAL

**IMPERVIOUS COVER
FOR
DEVELOPED AREAS**



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 Bonnini, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

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

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.113 (0.094-0.136)	0.158 (0.132-0.190)	0.220 (0.184-0.266)	0.274 (0.227-0.335)	0.352 (0.281-0.445)	0.416 (0.325-0.537)	0.485 (0.369-0.643)	0.560 (0.414-0.765)	0.670 (0.474-0.956)	0.762 (0.520-1.13)
10-min	0.161 (0.135-0.194)	0.226 (0.189-0.273)	0.316 (0.264-0.382)	0.393 (0.325-0.480)	0.505 (0.403-0.638)	0.596 (0.466-0.770)	0.695 (0.529-0.921)	0.803 (0.594-1.10)	0.960 (0.680-1.37)	1.09 (0.746-1.62)
15-min	0.195 (0.164-0.235)	0.273 (0.229-0.330)	0.382 (0.319-0.462)	0.475 (0.394-0.580)	0.610 (0.488-0.771)	0.721 (0.564-0.932)	0.840 (0.640-1.11)	0.971 (0.718-1.33)	1.16 (0.822-1.66)	1.32 (0.902-1.95)
30-min	0.295 (0.247-0.355)	0.413 (0.346-0.498)	0.576 (0.481-0.697)	0.717 (0.594-0.875)	0.921 (0.736-1.16)	1.09 (0.851-1.41)	1.27 (0.966-1.68)	1.47 (1.08-2.00)	1.75 (1.24-2.50)	1.99 (1.36-2.95)
60-min	0.438 (0.367-0.527)	0.613 (0.514-0.739)	0.856 (0.715-1.03)	1.07 (0.882-1.30)	1.37 (1.09-1.73)	1.62 (1.26-2.09)	1.88 (1.44-2.50)	2.18 (1.61-2.97)	2.60 (1.84-3.71)	2.96 (2.02-4.38)
2-hr	0.634 (0.532-0.764)	0.848 (0.710-1.02)	1.14 (0.955-1.38)	1.40 (1.16-1.71)	1.77 (1.41-2.23)	2.07 (1.62-2.67)	2.39 (1.82-3.17)	2.75 (2.03-3.75)	3.26 (2.31-4.66)	3.70 (2.53-5.47)
3-hr	0.776 (0.651-0.935)	1.02 (0.854-1.23)	1.36 (1.13-1.64)	1.65 (1.36-2.01)	2.07 (1.65-2.61)	2.41 (1.89-3.12)	2.79 (2.12-3.69)	3.20 (2.36-4.36)	3.80 (2.69-5.42)	4.31 (2.94-6.38)
6-hr	1.10 (0.923-1.33)	1.42 (1.19-1.71)	1.86 (1.56-2.25)	2.25 (1.86-2.74)	2.80 (2.24-3.54)	3.26 (2.55-4.21)	3.76 (2.87-4.99)	4.31 (3.19-5.89)	5.14 (3.64-7.33)	5.84 (3.99-8.64)
12-hr	1.47 (1.23-1.77)	1.90 (1.59-2.29)	2.49 (2.08-3.02)	3.01 (2.49-3.67)	3.76 (3.01-4.76)	4.39 (3.43-5.67)	5.07 (3.86-6.72)	5.82 (4.31-7.95)	6.94 (4.92-9.90)	7.90 (5.39-11.7)
24-hr	1.92 (1.70-2.22)	2.51 (2.22-2.90)	3.34 (2.94-3.87)	4.07 (3.55-4.75)	5.13 (4.34-6.18)	6.01 (4.98-7.39)	6.97 (5.65-8.77)	8.03 (6.34-10.4)	9.60 (7.28-12.9)	10.9 (8.01-15.2)
2-day	2.31 (2.04-2.67)	3.09 (2.72-3.57)	4.18 (3.68-4.84)	5.14 (4.49-6.00)	6.54 (5.54-7.89)	7.71 (6.40-9.49)	8.99 (7.28-11.3)	10.4 (8.20-13.4)	12.5 (9.45-16.8)	14.2 (10.4-19.8)
3-day	2.47 (2.18-2.85)	3.35 (2.96-3.88)	4.60 (4.05-5.33)	5.69 (4.97-6.65)	7.30 (6.18-8.80)	8.64 (7.17-10.6)	10.1 (8.19-12.7)	11.7 (9.25-15.2)	14.1 (10.7-19.0)	16.1 (11.8-22.4)
4-day	2.66 (2.35-3.07)	3.64 (3.22-4.21)	5.04 (4.44-5.84)	6.26 (5.47-7.31)	8.06 (6.82-9.72)	9.57 (7.94-11.8)	11.2 (9.09-14.1)	13.0 (10.3-16.9)	15.7 (11.9-21.2)	18.0 (13.2-25.0)
7-day	3.03 (2.68-3.50)	4.21 (3.71-4.86)	5.87 (5.17-6.81)	7.34 (6.41-8.57)	9.51 (8.05-11.5)	11.3 (9.40-13.9)	13.3 (10.8-16.8)	15.5 (12.3-20.1)	18.8 (14.3-25.3)	21.6 (15.9-30.1)
10-day	3.26 (2.88-3.76)	4.55 (4.02-5.26)	6.40 (5.63-7.41)	8.02 (7.01-9.37)	10.4 (8.83-12.6)	12.5 (10.3-15.3)	14.7 (11.9-18.5)	17.1 (13.5-22.2)	20.8 (15.8-28.0)	23.9 (17.5-33.3)
20-day	3.94 (3.49-4.55)	5.57 (4.92-6.44)	7.89 (6.95-9.14)	9.94 (8.69-11.6)	13.0 (11.0-15.7)	15.5 (12.9-19.1)	18.4 (14.9-23.1)	21.5 (17.0-27.8)	26.2 (19.8-35.2)	30.2 (22.1-42.0)
30-day	4.67 (4.13-5.39)	6.60 (5.83-7.63)	9.36 (8.24-10.8)	11.8 (10.3-13.8)	15.4 (13.0-18.6)	18.4 (15.3-22.7)	21.8 (17.7-27.4)	25.5 (20.1-33.0)	31.1 (23.6-41.8)	35.8 (26.3-49.8)
45-day	5.55 (4.91-6.41)	7.79 (6.88-9.00)	11.0 (9.66-12.7)	13.8 (12.0-16.1)	17.9 (15.2-21.6)	21.4 (17.8-26.3)	25.2 (20.5-31.8)	29.5 (23.3-38.2)	35.9 (27.3-48.4)	41.4 (30.4-57.6)
60-day	6.49 (5.73-7.49)	9.00 (7.95-10.4)	12.6 (11.1-14.6)	15.7 (13.7-18.3)	20.3 (17.2-24.5)	24.2 (20.1-29.8)	28.5 (23.1-35.9)	33.3 (26.3-43.1)	40.5 (30.7-54.5)	46.6 (34.2-64.8)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

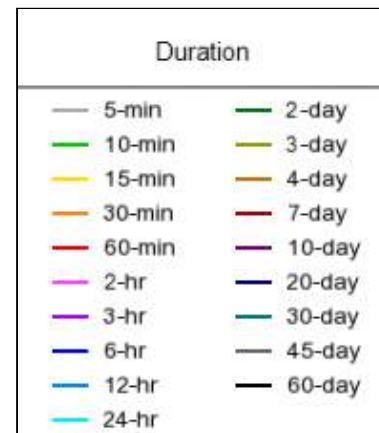
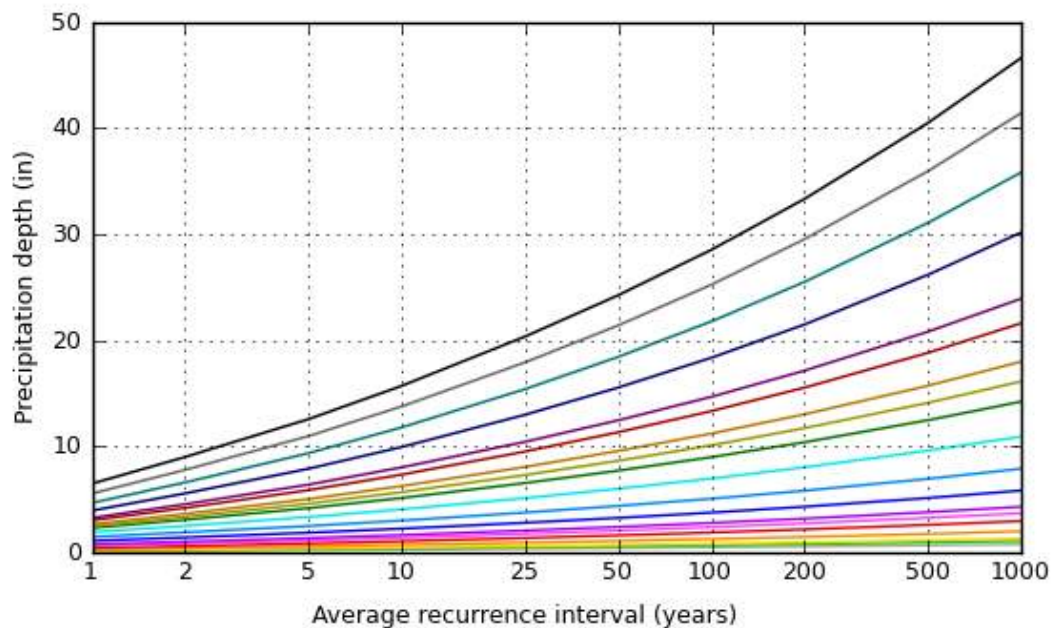
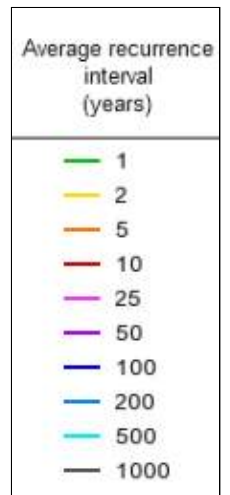
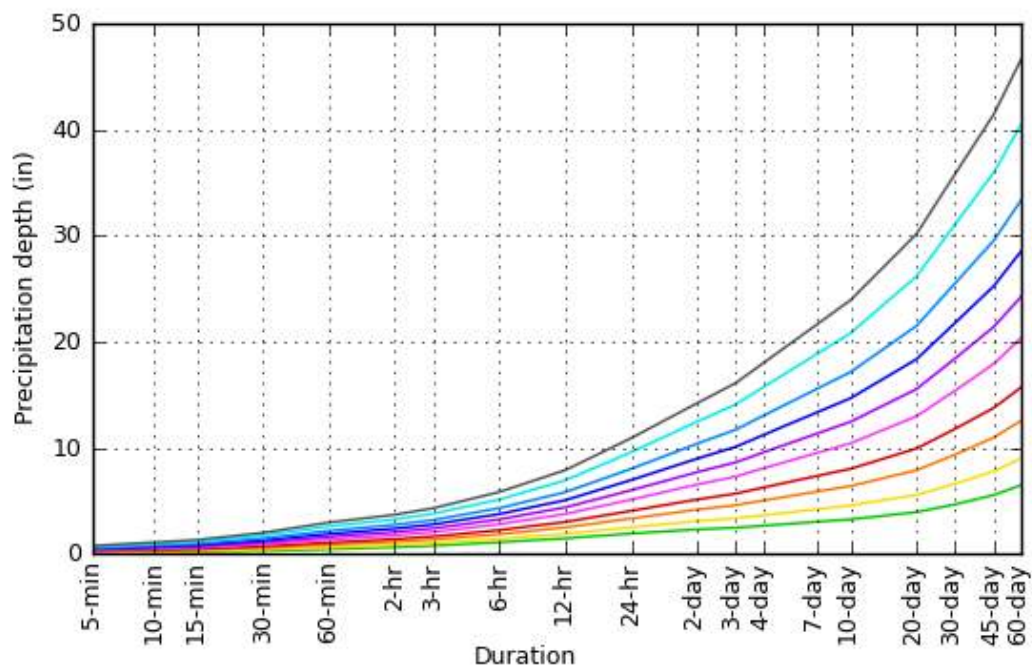
Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

PF graphical

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

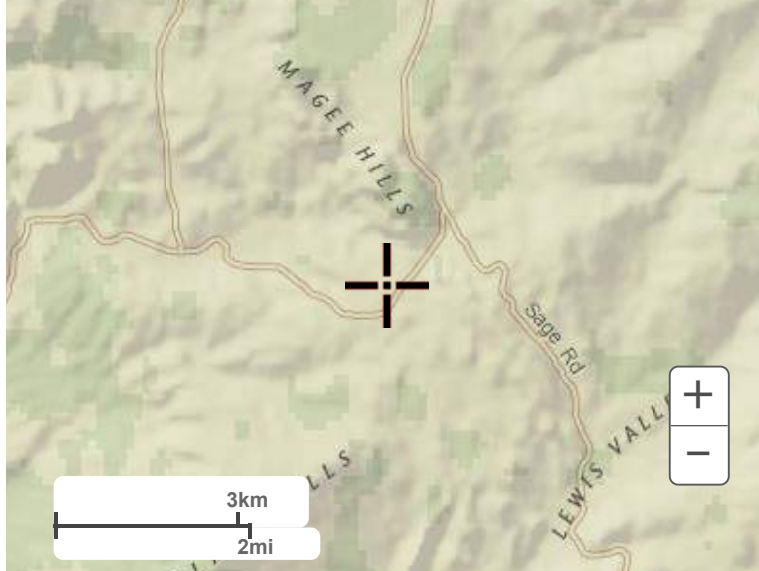
Latitude: 33.5695°, Longitude: -116.9423°



[Back to Top](#)

Maps & aeriels

Small scale terrain



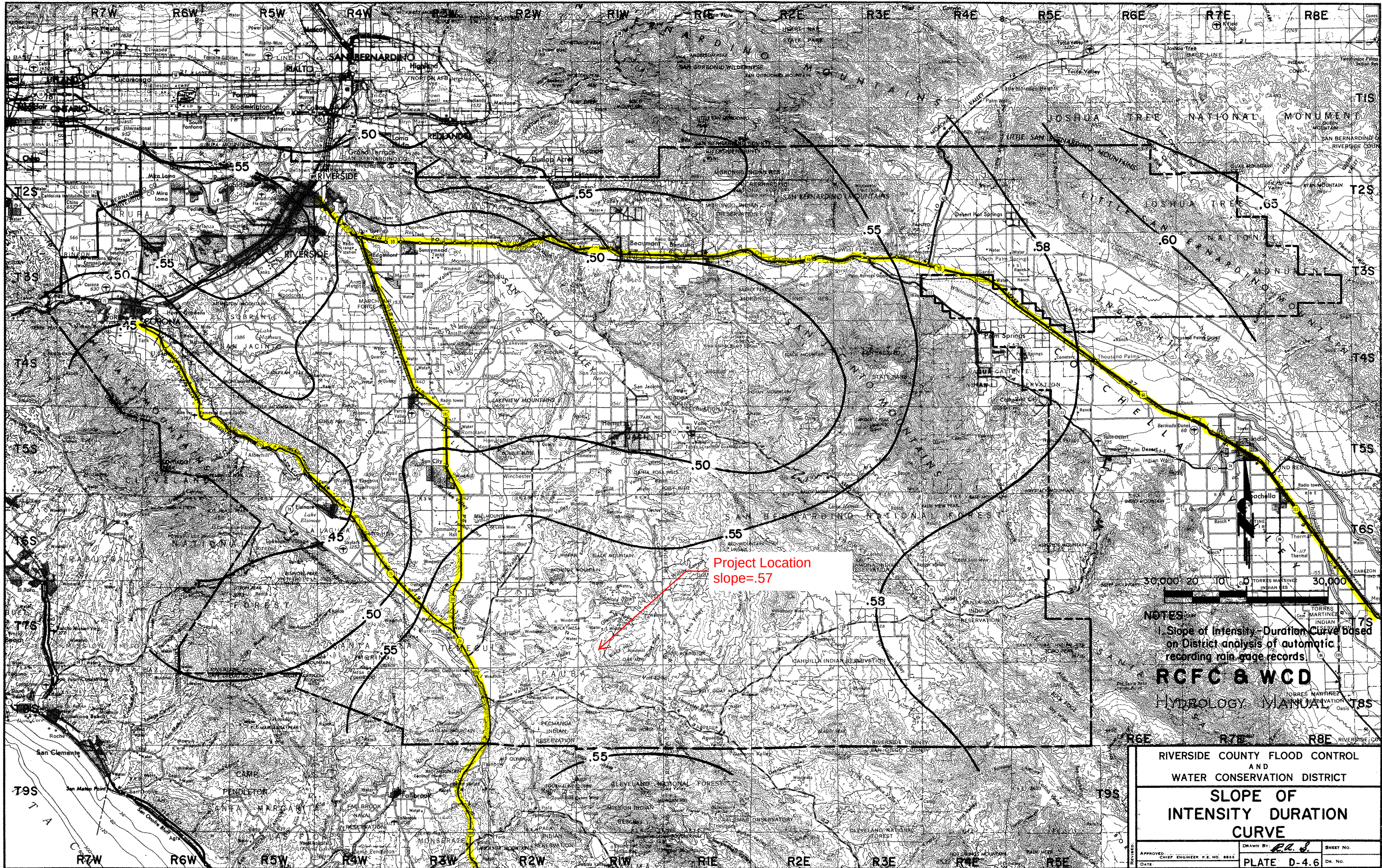
Large scale terrain



Large scale map



Large scale aerial



Project Location
slope=.57

NOTES
1. Slope of Intensity-Duration Curve based on District analysis of automatic recording rain gage records.

RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
**SLOPE OF
INTENSITY DURATION
CURVE**

APPROVED: CHIEF ENGINEER P.E. NO. 8822	DRAWN BY: <i>R.C. J.</i>	SHEET NO.
DATE	PLATE D-4.6	DR. NO.

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

RCFC & WCD
HYDROLOGY MANUAL

**RUNOFF INDEX NUMBERS
FOR
PERVIOUS AREA**

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

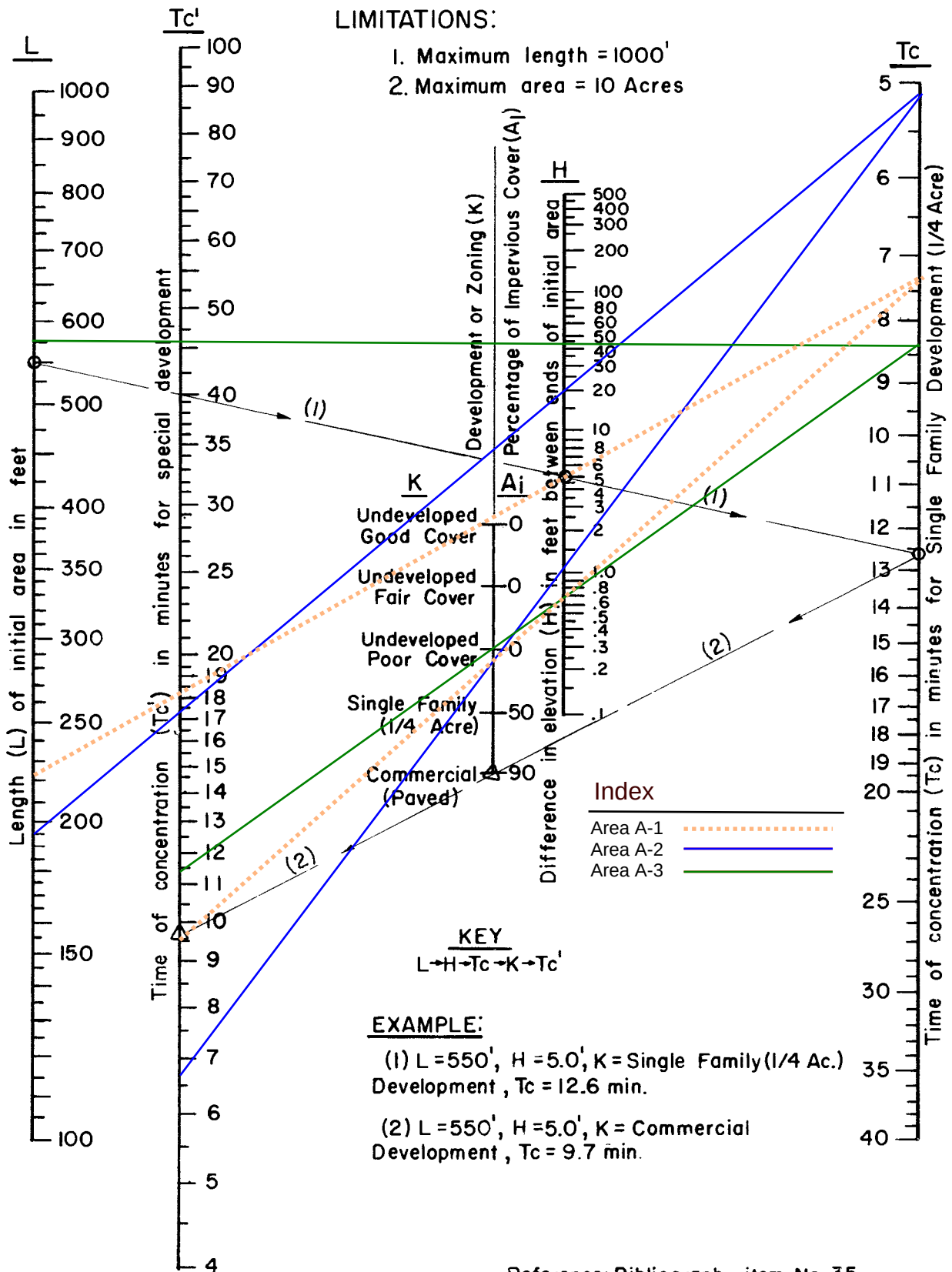
Cover Type (3)	Quality of Cover (2)	Soil Group			
		A	B	C	D
<u>AGRICULTURAL COVERS</u> (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.
2. Quality of cover definitions:
 Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
 Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
 Good-Heavy or dense cover with more than 75 percent of the ground surface protected.
3. See Plate C-2 for a detailed description of cover types.
4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.
5. Reference Bibliography item 17.

RCFC & WCD
HYDROLOGY MANUAL

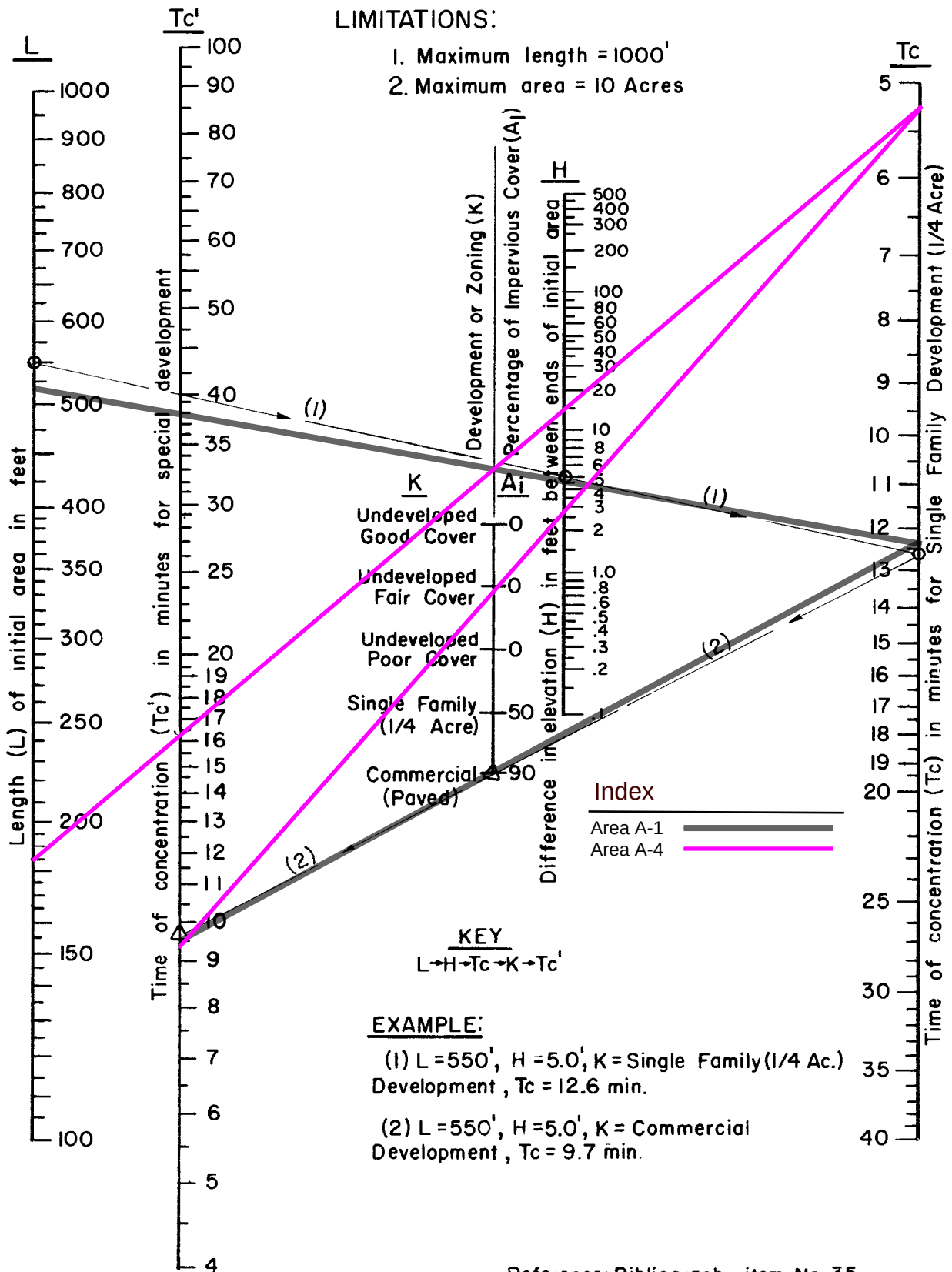
**RUNOFF INDEX NUMBERS
FOR
PERVIOUS AREA**



Reference: Bibliography item No. 35.

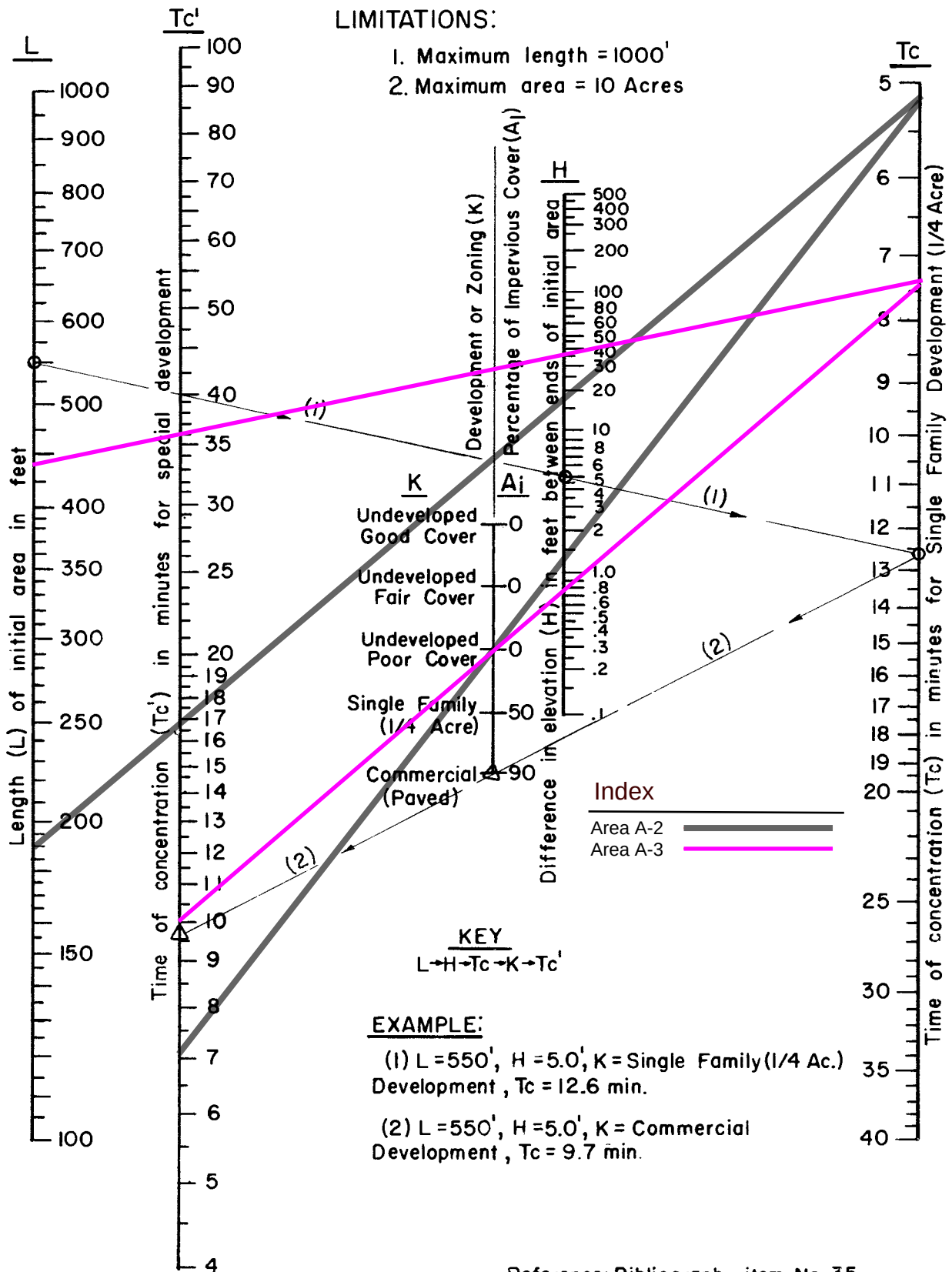
RCFC & WCD
HYDROLOGY MANUAL

**TIME OF CONCENTRATION
FOR INITIAL SUBAREA**



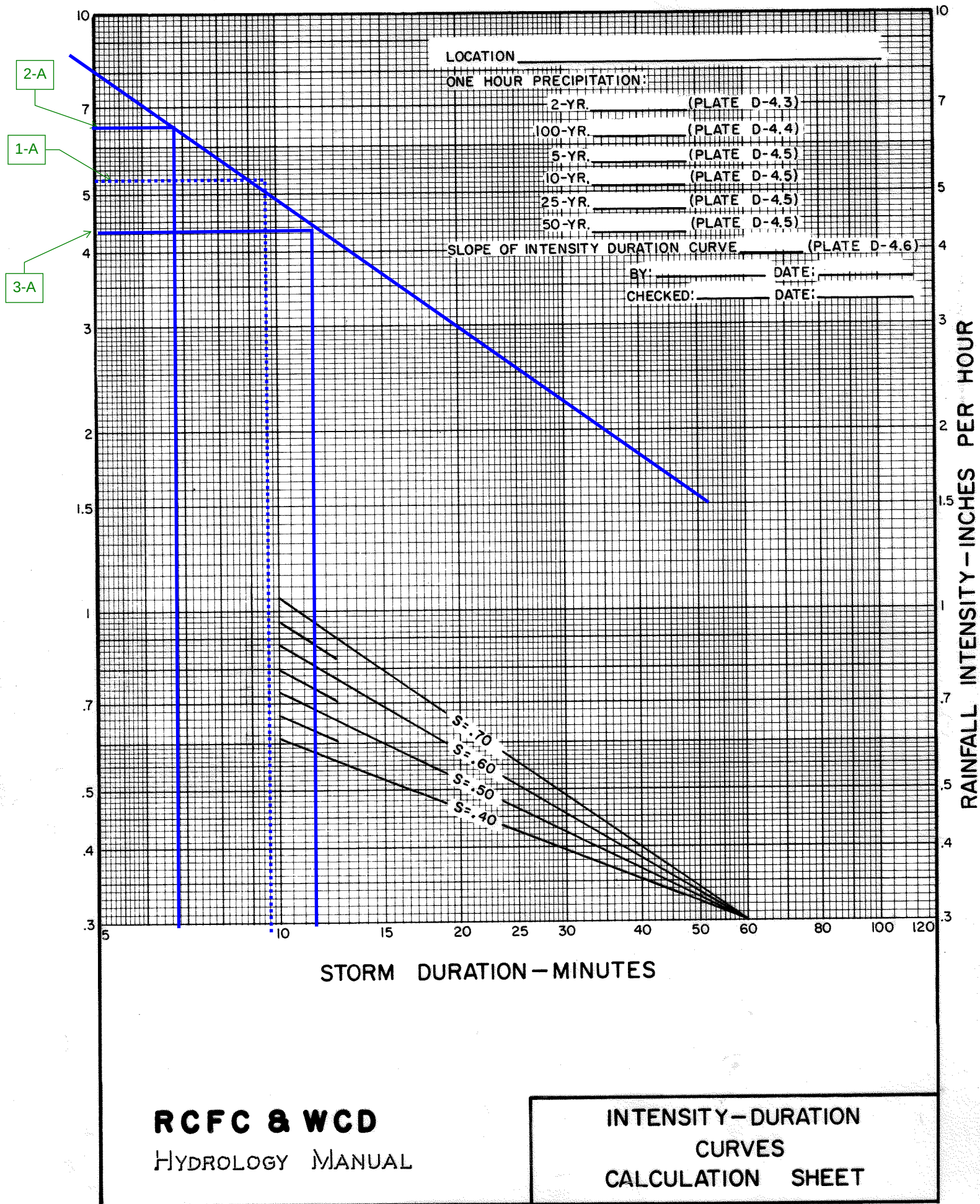
RCFC & WCD
 HYDROLOGY MANUAL

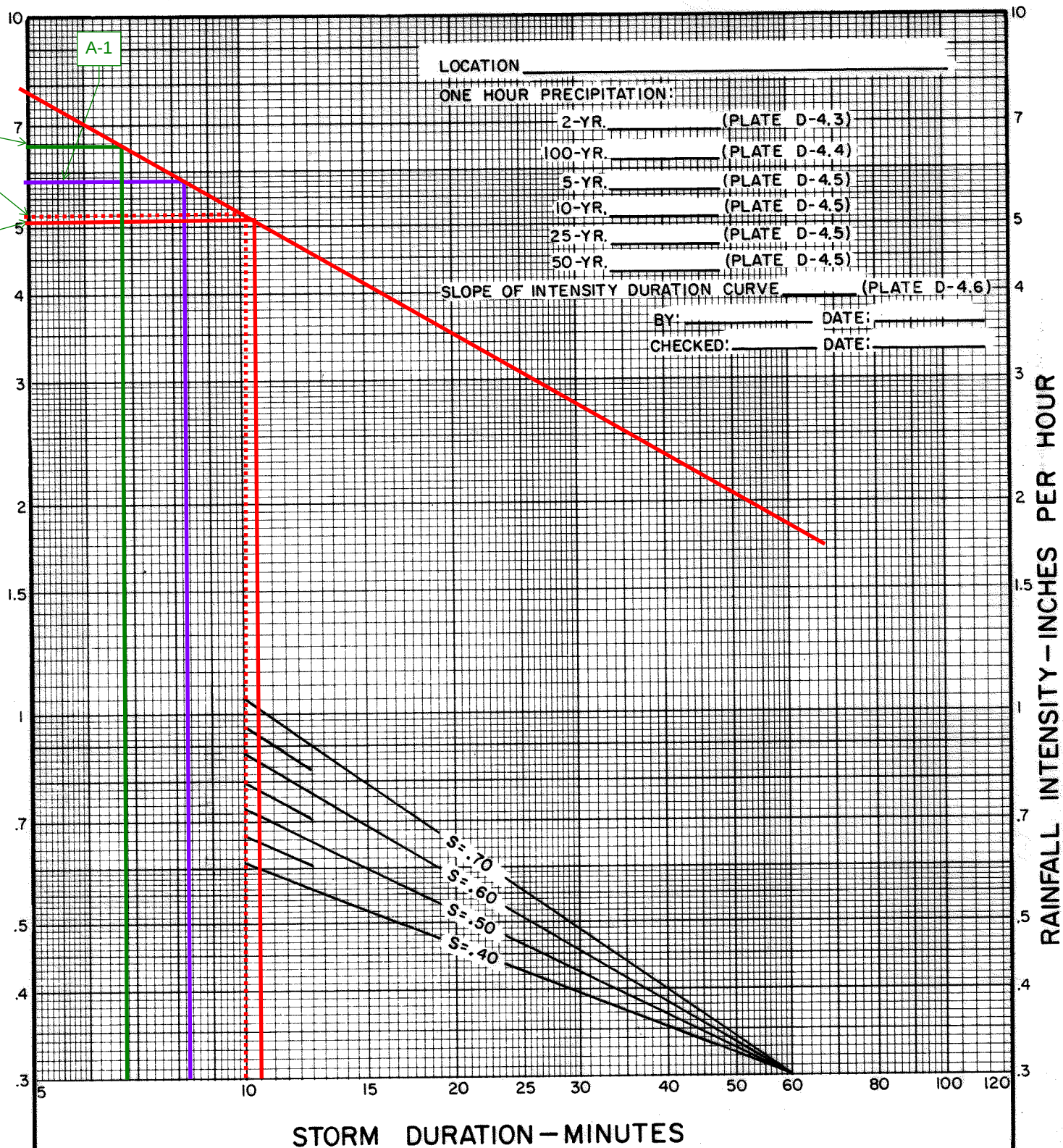
**TIME OF CONCENTRATION
 FOR INITIAL SUBAREA**



RCFC & WCD
HYDROLOGY MANUAL

**TIME OF CONCENTRATION
FOR INITIAL SUBAREA**





RUNOFF COEFFICIENT CURVE DATA

The data in the following tables may be used to develop runoff coefficient (C) curves for any combination of runoff index (RI) number and antecedent moisture condition (AMC). For an RI number with an AMC of II (from Plate D-5.5) enter the tables on the following pages and plot the "C" curve data directly on Plate D-5.8. "C" curve data is given for even RI numbers only, but values may easily be interpolated for odd RI numbers.

For an AMC of I or III enter the tabulation on this page with the RI for AMC II, and read the appropriate RI for AMC I or III. Use this revised RI to enter the tables on the following pages to determine "C". For example if RI = 40 for AMC II, then RI = 22 for AMC I and RI = 60 for AMC III.

AMC ADJUSTMENT RELATIONSHIPS

RI FOR AMC II	RI FOR OTHER AMC CONDITIONS: AMC I AMC III		RI FOR AMC II	RI FOR OTHER AMC CONDITIONS: AMC I AMC III	
10	--	22	55	35	74
11	--	24	56	36	75
12	--	25	57	37	75
13	--	27	58	38	76
14	--	28	59	39	77
15	--	30	60	40	78
16	--	31	61	41	78
17	--	33	62	42	79
18	--	34	63	43	80
19	--	36	64	44	81
20	--	37	65	45	82
21	10	38	66	46	82
22	10	39	67	47	83
23	11	41	68	48	84
24	11	42	69	50	84
25	12	43	70	51	85
26	12	44	71	52	86
27	13	46	72	53	86
28	14	47	73	54	87
29	14	49	74	55	88
30	15	50	75	57	88
31	16	51	76	58	89
32	16	52	77	59	89
33	17	53	78	60	90
34	18	54	79	62	91
35	18	55	80	63	91
36	19	56	81	64	92
37	20	57	82	66	92
38	21	58	83	67	93
39	21	59	84	68	93
40	22	60	85	70	94
41	23	61	86	72	94
42	24	62	87	73	95
43	25	63	88	75	95
44	25	64	89	76	96
45	26	65	90	78	96
46	27	66	91	80	97
47	28	67	92	81	97
48	29	68	93	83	98
49	30	69	94	85	98
50	31	70	95	87	98
51	31	70	96	89	99
52	32	71	97	91	99
53	33	72	98	94	99
54	34	73	99	97	--

RCFC & WCD
HYDROLOGY MANUAL

RUNOFF COEFFICIENT
CURVE DATA

RCFC & WCD

HYDROLOGY MANUAL

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 12

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.04	.08	.12	.15	.18	.21	.24	.26	.30	.34
5.	.04	.09	.12	.16	.19	.22	.25	.27	.29	.33	.37
10.	.09	.13	.17	.20	.23	.25	.28	.30	.33	.36	.40
15.	.13	.17	.21	.24	.26	.29	.31	.34	.36	.39	.43
20.	.18	.22	.25	.28	.30	.33	.35	.37	.39	.42	.45
25.	.22	.26	.29	.31	.34	.36	.38	.40	.42	.45	.48
30.	.27	.30	.33	.35	.38	.40	.42	.44	.45	.48	.51
35.	.31	.34	.37	.39	.41	.43	.45	.47	.48	.51	.54
40.	.36	.39	.41	.43	.45	.47	.49	.50	.52	.54	.57
45.	.40	.43	.45	.47	.49	.51	.52	.54	.55	.57	.59
50.	.45	.47	.49	.51	.53	.54	.56	.57	.58	.60	.62
55.	.49	.51	.53	.55	.56	.58	.59	.60	.61	.63	.65
60.	.54	.56	.57	.59	.60	.61	.62	.63	.64	.66	.68
65.	.58	.60	.61	.63	.64	.65	.66	.67	.68	.69	.70
70.	.63	.64	.66	.67	.68	.69	.70	.71	.72	.73	.74
75.	.67	.69	.70	.71	.72	.73	.74	.75	.76	.77	.78
80.	.72	.73	.74	.75	.76	.77	.77	.78	.79	.80	.81
85.	.76	.77	.78	.79	.80	.80	.80	.80	.81	.82	.83
90.	.81	.81	.82	.82	.83	.83	.83	.83	.84	.84	.85
95.	.86	.86	.86	.86	.86	.87	.87	.87	.87	.88	.88
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 14

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.05	.10	.14	.18	.21	.24	.27	.30	.34	.38
5.	.04	.09	.14	.18	.21	.24	.27	.30	.33	.37	.41
10.	.09	.14	.18	.22	.25	.28	.31	.33	.36	.40	.43
15.	.13	.18	.22	.25	.29	.31	.34	.36	.39	.42	.46
20.	.18	.22	.26	.29	.32	.35	.37	.40	.42	.45	.48
25.	.22	.26	.30	.33	.36	.38	.41	.43	.45	.48	.51
30.	.27	.31	.34	.37	.39	.42	.44	.46	.48	.51	.54
35.	.31	.35	.38	.41	.43	.45	.47	.49	.51	.54	.56
40.	.36	.39	.42	.44	.47	.49	.50	.52	.54	.56	.59
45.	.40	.43	.46	.48	.50	.52	.54	.55	.57	.59	.61
50.	.45	.48	.50	.52	.54	.56	.57	.58	.60	.62	.64
55.	.49	.52	.54	.56	.57	.59	.60	.62	.63	.65	.67
60.	.54	.56	.58	.60	.61	.62	.64	.65	.66	.68	.69
65.	.58	.60	.62	.63	.65	.66	.67	.68	.69	.70	.72
70.	.63	.65	.66	.67	.68	.69	.70	.71	.72	.73	.74
75.	.67	.69	.70	.71	.72	.73	.74	.74	.75	.76	.77
80.	.72	.73	.74	.75	.76	.76	.77	.77	.78	.79	.80
85.	.76	.77	.78	.79	.79	.80	.80	.81	.81	.82	.82
90.	.81	.82	.82	.82	.83	.83	.83	.83	.84	.84	.85
95.	.86	.86	.86	.86	.86	.87	.87	.87	.87	.88	.88
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 16

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.06	.11	.16	.20	.24	.27	.30	.33	.38	.42
5.	.04	.10	.15	.20	.23	.27	.30	.33	.36	.40	.44
10.	.09	.14	.19	.23	.27	.30	.33	.36	.38	.43	.46
15.	.13	.19	.23	.27	.31	.34	.36	.39	.41	.45	.49
20.	.18	.23	.27	.31	.34	.37	.40	.42	.44	.48	.51
25.	.22	.27	.31	.34	.38	.40	.43	.45	.47	.51	.54
30.	.27	.31	.35	.38	.41	.44	.46	.48	.50	.53	.56
35.	.31	.35	.39	.42	.45	.47	.49	.51	.53	.56	.58
40.	.36	.40	.43	.46	.48	.50	.52	.54	.56	.58	.61
45.	.40	.44	.47	.49	.51	.54	.55	.57	.58	.61	.63
50.	.45	.48	.51	.53	.55	.57	.58	.60	.61	.64	.66
55.	.49	.52	.55	.57	.58	.60	.62	.63	.64	.66	.68
60.	.54	.56	.58	.60	.62	.63	.65	.66	.67	.69	.71
65.	.58	.61	.62	.64	.65	.67	.68	.69	.70	.72	.73
70.	.63	.65	.66	.68	.69	.70	.71	.72	.73	.74	.75
75.	.67	.69	.70	.71	.73	.73	.74	.75	.76	.77	.78
80.	.72	.73	.74	.75	.76	.77	.77	.78	.79	.80	.81
85.	.76	.77	.78	.79	.79	.80	.80	.81	.81	.82	.83
90.	.81	.82	.82	.83	.83	.83	.83	.84	.84	.85	.85
95.	.86	.86	.86	.86	.87	.87	.87	.87	.87	.88	.88
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 18

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.07	.13	.18	.22	.26	.30	.33	.36	.41	.45
5.	.04	.11	.17	.21	.26	.29	.33	.36	.38	.43	.47
10.	.09	.15	.20	.25	.29	.33	.36	.39	.41	.46	.49
15.	.13	.19	.24	.29	.32	.36	.39	.41	.44	.48	.52
20.	.18	.23	.28	.32	.36	.39	.42	.44	.47	.51	.54
25.	.22	.28	.32	.36	.39	.42	.45	.47	.49	.53	.56
30.	.27	.32	.36	.39	.43	.45	.48	.50	.52	.55	.58
35.	.31	.36	.40	.43	.46	.49	.51	.53	.55	.58	.61
40.	.36	.40	.44	.47	.49	.52	.54	.56	.57	.60	.63
45.	.40	.44	.47	.50	.53	.55	.57	.59	.60	.63	.65
50.	.45	.48	.51	.54	.56	.58	.60	.61	.63	.65	.67
55.	.49	.53	.55	.58	.60	.61	.63	.64	.66	.68	.70
60.	.54	.57	.59	.61	.63	.64	.66	.67	.68	.70	.72
65.	.58	.61	.63	.65	.66	.68	.69	.70	.71	.73	.74
70.	.63	.65	.67	.68	.70	.71	.72	.73	.74	.75	.76
75.	.67	.69	.71	.72	.73	.74	.75	.76	.76	.77	.79
80.	.72	.73	.75	.76	.76	.77	.78	.79	.79	.80	.81
85.	.76	.78	.78	.79	.80	.80	.81	.81	.82	.83	.83
90.	.81	.82	.82	.83	.83	.84	.84	.84	.85	.85	.85
95.	.86	.86	.86	.86	.87	.87	.87	.87	.87	.88	.88
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENT

CURVE DATA

RCFC & WCD

HYDROLOGY MANUAL

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 20

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.08	.14	.20	.25	.29	.32	.35	.36	.39	.44
5.	.04	.12	.18	.23	.28	.32	.35	.38	.41	.46	.50
10.	.09	.16	.22	.27	.31	.35	.38	.41	.44	.48	.52
15.	.13	.20	.26	.30	.34	.38	.41	.44	.46	.51	.54
20.	.18	.24	.29	.34	.38	.41	.44	.47	.49	.53	.56
25.	.22	.28	.33	.37	.41	.44	.47	.49	.51	.55	.58
30.	.27	.32	.37	.41	.44	.47	.50	.52	.54	.57	.60
35.	.31	.37	.41	.44	.47	.50	.53	.55	.57	.60	.62
40.	.36	.41	.45	.48	.51	.53	.55	.57	.59	.62	.65
45.	.40	.45	.48	.51	.54	.56	.58	.60	.62	.64	.67
50.	.45	.49	.52	.55	.57	.59	.61	.63	.64	.67	.69
55.	.49	.53	.56	.58	.61	.62	.64	.66	.67	.69	.71
60.	.54	.57	.60	.62	.64	.65	.67	.68	.69	.71	.73
65.	.58	.61	.63	.65	.67	.69	.70	.71	.72	.74	.75
70.	.63	.65	.67	.69	.70	.72	.73	.74	.75	.76	.77
75.	.67	.69	.71	.72	.74	.75	.76	.76	.77	.78	.79
80.	.72	.74	.75	.76	.77	.78	.78	.79	.80	.81	.82
85.	.76	.78	.79	.79	.80	.81	.81	.82	.82	.83	.84
90.	.81	.82	.82	.83	.83	.84	.84	.85	.85	.85	.86
95.	.86	.86	.86	.86	.87	.87	.87	.87	.87	.88	.88
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 22

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.09	.16	.22	.27	.31	.35	.38	.41	.46	.50
5.	.04	.13	.19	.25	.30	.34	.38	.41	.46	.51	.54
10.	.09	.17	.23	.29	.33	.37	.40	.43	.46	.49	.53
15.	.13	.21	.27	.32	.36	.40	.43	.46	.49	.51	.55
20.	.18	.25	.31	.35	.39	.43	.46	.49	.51	.55	.58
25.	.22	.29	.34	.39	.43	.46	.49	.51	.53	.57	.60
30.	.27	.33	.38	.42	.46	.49	.51	.54	.56	.59	.62
35.	.31	.37	.42	.46	.49	.52	.54	.56	.58	.62	.64
40.	.36	.41	.45	.49	.52	.55	.57	.59	.61	.64	.66
45.	.40	.45	.49	.52	.55	.58	.60	.62	.63	.66	.68
50.	.45	.49	.53	.56	.58	.61	.62	.64	.66	.68	.70
55.	.49	.53	.57	.59	.62	.64	.65	.67	.68	.70	.72
60.	.54	.57	.60	.63	.65	.66	.68	.69	.70	.73	.74
65.	.58	.62	.64	.66	.68	.69	.71	.72	.73	.75	.76
70.	.63	.66	.68	.70	.71	.72	.73	.74	.75	.77	.78
75.	.67	.70	.71	.73	.74	.75	.76	.77	.78	.79	.80
80.	.72	.74	.75	.76	.77	.78	.79	.80	.80	.81	.82
85.	.76	.78	.79	.80	.81	.81	.82	.82	.83	.83	.84
90.	.81	.82	.83	.83	.84	.84	.84	.85	.85	.86	.86
95.	.86	.86	.86	.87	.87	.87	.87	.87	.87	.88	.88
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 24

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.10	.17	.24	.29	.33	.37	.41	.44	.49	.53
5.	.04	.14	.21	.27	.32	.36	.40	.43	.46	.51	.55
10.	.09	.18	.25	.30	.35	.39	.43	.46	.48	.53	.57
15.	.13	.22	.28	.34	.38	.42	.45	.48	.51	.55	.58
20.	.18	.26	.32	.37	.41	.45	.48	.51	.53	.57	.60
25.	.22	.30	.35	.40	.44	.48	.51	.53	.55	.59	.62
30.	.27	.34	.39	.44	.47	.50	.53	.56	.58	.61	.64
35.	.31	.38	.43	.47	.50	.53	.56	.58	.60	.63	.66
40.	.36	.42	.46	.50	.53	.56	.58	.60	.62	.65	.68
45.	.40	.46	.50	.53	.56	.59	.61	.63	.65	.67	.70
50.	.45	.50	.54	.57	.59	.62	.64	.65	.67	.69	.71
55.	.49	.54	.57	.60	.63	.65	.66	.68	.69	.71	.73
60.	.54	.58	.61	.63	.66	.67	.69	.70	.72	.74	.75
65.	.58	.62	.65	.67	.69	.70	.72	.73	.74	.76	.77
70.	.63	.66	.68	.70	.72	.73	.74	.75	.76	.78	.79
75.	.67	.70	.72	.73	.75	.76	.77	.78	.78	.80	.81
80.	.72	.74	.75	.77	.78	.79	.79	.80	.81	.82	.83
85.	.76	.78	.79	.80	.81	.82	.82	.83	.83	.84	.84
90.	.81	.82	.83	.83	.84	.84	.85	.85	.85	.86	.86
95.	.86	.86	.86	.87	.87	.87	.87	.87	.88	.88	.88
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 26

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.10	.19	.25	.31	.36	.40	.43	.46	.51	.55
5.	.04	.14	.22	.29	.34	.38	.42	.46	.48	.53	.57
10.	.09	.18	.26	.32	.37	.41	.45	.48	.51	.55	.59
15.	.13	.22	.29	.35	.40	.44	.47	.50	.53	.57	.60
20.	.18	.26	.33	.38	.43	.47	.50	.53	.55	.59	.62
25.	.22	.30	.37	.42	.46	.49	.52	.55	.57	.61	.64
30.	.27	.34	.40	.45	.49	.52	.55	.57	.59	.63	.66
35.	.31	.38	.44	.48	.52	.55	.57	.60	.62	.65	.67
40.	.36	.42	.47	.51	.55	.58	.60	.62	.64	.67	.69
45.	.40	.46	.51	.55	.58	.60	.62	.64	.66	.69	.71
50.	.45	.50	.54	.58	.61	.63	.65	.67	.68	.71	.73
55.	.49	.54	.58	.61	.63	.66	.67	.69	.70	.73	.74
60.	.54	.58	.62	.64	.66	.68	.70	.71	.72	.74	.76
65.	.58	.62	.65	.67	.69	.71	.72	.74	.75	.77	.78
70.	.63	.66	.69	.71	.72	.74	.75	.76	.77	.78	.80
75.	.67	.70	.72	.74	.75	.76	.77	.78	.79	.80	.81
80.	.72	.74	.76	.77	.78	.79	.80	.81	.81	.82	.83
85.	.76	.78	.79	.80	.81	.82	.82	.83	.83	.84	.85
90.	.81	.82	.83	.83	.84	.84	.85	.85	.85	.86	.87
95.	.86	.86	.86	.87	.87	.87	.87	.87	.87	.88	.88
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENT

CURVE DATA

RCFC & WCD

HYDROLOGY MANUAL

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 28

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.11	.20	.27	.33	.38	.42	.45	.48	.53	.57
5.	.04	.15	.24	.31	.36	.41	.44	.48	.51	.55	.59
10.	.09	.19	.27	.34	.39	.43	.47	.50	.53	.57	.61
15.	.13	.23	.31	.37	.42	.46	.49	.52	.55	.59	.62
20.	.18	.27	.34	.40	.45	.48	.52	.54	.57	.61	.64
25.	.22	.31	.38	.43	.47	.51	.54	.57	.59	.63	.65
30.	.27	.35	.41	.46	.50	.54	.56	.59	.61	.64	.67
35.	.31	.39	.45	.49	.53	.56	.59	.61	.63	.66	.69
40.	.36	.43	.48	.52	.56	.59	.61	.63	.65	.68	.70
45.	.40	.47	.52	.56	.59	.61	.64	.66	.67	.70	.72
50.	.45	.51	.55	.59	.62	.64	.66	.68	.69	.72	.74
55.	.49	.55	.59	.62	.64	.66	.68	.70	.71	.74	.75
60.	.54	.59	.62	.65	.67	.69	.71	.72	.73	.75	.77
65.	.58	.63	.66	.68	.70	.72	.73	.74	.75	.77	.79
70.	.63	.66	.69	.71	.73	.74	.76	.77	.78	.79	.80
75.	.67	.70	.73	.74	.76	.77	.78	.79	.80	.81	.82
80.	.72	.74	.76	.77	.79	.80	.80	.81	.82	.83	.83
85.	.76	.78	.80	.81	.81	.82	.83	.84	.84	.85	.85
90.	.81	.82	.83	.84	.84	.85	.85	.86	.86	.86	.87
95.	.86	.86	.87	.87	.87	.87	.88	.88	.88	.88	.88
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 30

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.12	.22	.29	.35	.40	.44	.48	.51	.55	.59
5.	.04	.16	.25	.32	.38	.43	.46	.50	.53	.57	.61
10.	.09	.20	.29	.35	.41	.45	.49	.52	.55	.59	.62
15.	.13	.24	.32	.38	.43	.48	.51	.54	.57	.61	.64
20.	.18	.28	.36	.41	.46	.50	.53	.56	.59	.62	.65
25.	.22	.32	.39	.44	.49	.53	.56	.58	.60	.64	.67
30.	.27	.36	.42	.47	.52	.55	.58	.60	.62	.66	.68
35.	.31	.40	.46	.51	.54	.58	.60	.62	.64	.68	.70
40.	.36	.43	.49	.54	.57	.60	.63	.65	.67	.72	.74
45.	.40	.47	.53	.57	.60	.63	.65	.67	.69	.73	.75
50.	.45	.51	.56	.60	.63	.65	.67	.69	.70	.73	.76
55.	.49	.55	.59	.63	.65	.68	.69	.71	.72	.74	.76
60.	.54	.59	.63	.66	.68	.70	.72	.73	.74	.76	.78
65.	.58	.63	.66	.69	.71	.73	.74	.75	.76	.78	.79
70.	.63	.67	.70	.72	.74	.75	.76	.77	.78	.80	.81
75.	.67	.71	.73	.75	.76	.77	.78	.79	.80	.81	.82
80.	.72	.74	.76	.78	.79	.80	.81	.82	.83	.84	.84
85.	.76	.78	.80	.81	.82	.83	.83	.84	.84	.85	.85
90.	.81	.82	.83	.84	.85	.85	.85	.86	.86	.87	.87
95.	.86	.86	.87	.87	.87	.87	.88	.88	.88	.88	.88
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 32

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.13	.23	.31	.37	.42	.46	.50	.53	.57	.61
5.	.04	.17	.27	.34	.40	.45	.48	.52	.55	.59	.63
10.	.09	.21	.30	.37	.43	.47	.51	.54	.56	.61	.64
15.	.13	.25	.33	.40	.45	.49	.53	.56	.58	.62	.65
20.	.18	.29	.37	.43	.48	.52	.55	.58	.60	.64	.67
25.	.22	.33	.40	.46	.50	.54	.57	.60	.62	.66	.68
30.	.27	.36	.43	.49	.53	.57	.59	.62	.64	.67	.70
35.	.31	.40	.47	.52	.56	.59	.62	.64	.66	.69	.71
40.	.36	.44	.50	.55	.58	.61	.64	.66	.68	.70	.73
45.	.40	.48	.53	.58	.61	.64	.66	.68	.69	.72	.74
50.	.45	.52	.57	.61	.64	.66	.68	.70	.71	.74	.76
55.	.49	.56	.60	.64	.66	.68	.70	.72	.73	.75	.77
60.	.54	.59	.63	.66	.69	.71	.73	.74	.75	.77	.78
65.	.58	.63	.67	.69	.72	.73	.75	.76	.77	.79	.80
70.	.63	.67	.70	.72	.74	.76	.77	.78	.79	.80	.81
75.	.67	.71	.73	.75	.77	.78	.79	.80	.81	.82	.83
80.	.72	.75	.77	.78	.79	.80	.81	.82	.83	.83	.84
85.	.76	.79	.80	.81	.82	.83	.83	.84	.84	.85	.86
90.	.81	.82	.83	.84	.85	.85	.86	.86	.86	.87	.87
95.	.86	.86	.87	.87	.87	.88	.88	.88	.88	.88	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 34

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.15	.25	.33	.39	.44	.48	.52	.55	.59	.63
5.	.04	.18	.28	.36	.42	.47	.50	.54	.56	.61	.64
10.	.09	.22	.32	.39	.44	.49	.52	.56	.58	.62	.66
15.	.13	.26	.35	.42	.47	.51	.55	.57	.60	.64	.67
20.	.18	.30	.38	.44	.49	.53	.57	.59	.62	.65	.68
25.	.22	.33	.41	.47	.52	.56	.59	.61	.63	.67	.70
30.	.27	.37	.45	.50	.54	.58	.61	.63	.65	.69	.71
35.	.31	.41	.48	.53	.57	.60	.63	.65	.67	.70	.72
40.	.36	.45	.51	.56	.60	.63	.65	.67	.69	.72	.74
45.	.40	.49	.54	.59	.62	.65	.67	.69	.71	.73	.75
50.	.45	.52	.58	.62	.65	.67	.69	.71	.72	.75	.76
55.	.49	.56	.61	.64	.67	.69	.71	.73	.74	.76	.78
60.	.54	.60	.64	.67	.70	.72	.73	.75	.76	.78	.79
65.	.58	.64	.67	.71	.73	.75	.76	.77	.78	.79	.81
70.	.63	.67	.71	.73	.75	.76	.77	.79	.80	.81	.82
75.	.67	.71	.74	.76	.77	.79	.80	.80	.81	.82	.83
80.	.72	.75	.77	.79	.80	.81	.82	.82	.83	.84	.85
85.	.76	.79	.80	.81	.82	.83	.84	.84	.85	.85	.86
90.	.81	.82	.83	.84	.84	.85	.85	.86	.86	.87	.87
95.	.86	.86	.87	.87	.87	.87	.88	.88	.88	.88	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENT

CURVE DATA

RCFC & WCD HYDROLOGY MANUAL

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 36

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.16	.27	.35	.41	.46	.50	.54	.57	.61	.65
5.	.04	.19	.30	.38	.44	.48	.52	.55	.58	.63	.66
10.	.09	.23	.33	.40	.46	.51	.54	.57	.60	.64	.67
15.	.13	.27	.36	.43	.49	.53	.56	.59	.62	.65	.68
20.	.18	.31	.39	.46	.51	.55	.58	.61	.63	.67	.70
25.	.22	.34	.43	.49	.53	.57	.60	.63	.65	.68	.71
30.	.27	.38	.46	.51	.56	.59	.62	.65	.67	.70	.72
35.	.31	.42	.49	.54	.58	.62	.64	.66	.68	.71	.73
40.	.36	.45	.52	.57	.61	.64	.66	.68	.70	.73	.75
45.	.40	.49	.55	.60	.63	.66	.68	.70	.72	.74	.76
50.	.45	.53	.58	.62	.66	.68	.70	.72	.73	.76	.77
55.	.49	.57	.62	.65	.68	.70	.72	.74	.75	.77	.79
60.	.54	.60	.65	.68	.71	.73	.75	.76	.77	.78	.80
65.	.58	.64	.68	.71	.73	.75	.77	.78	.79	.80	.81
70.	.63	.68	.71	.73	.75	.77	.78	.79	.80	.81	.82
75.	.67	.71	.74	.76	.78	.79	.80	.81	.82	.83	.84
80.	.72	.75	.77	.79	.80	.81	.82	.83	.83	.84	.85
85.	.76	.79	.81	.82	.83	.84	.84	.85	.85	.86	.86
90.	.81	.83	.84	.84	.85	.86	.86	.86	.87	.87	.87
95.	.86	.86	.87	.87	.88	.88	.88	.88	.88	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 38

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.17	.28	.37	.43	.48	.52	.56	.58	.63	.66
5.	.04	.20	.31	.39	.45	.50	.54	.57	.60	.64	.67
10.	.09	.24	.35	.42	.48	.52	.56	.59	.61	.65	.68
15.	.13	.28	.38	.45	.50	.54	.58	.61	.63	.67	.70
20.	.18	.31	.41	.47	.52	.56	.60	.62	.65	.68	.71
25.	.22	.35	.44	.50	.55	.59	.62	.64	.66	.70	.72
30.	.27	.39	.47	.53	.57	.61	.64	.66	.68	.71	.73
35.	.31	.42	.50	.55	.60	.63	.66	.68	.69	.72	.74
40.	.36	.46	.53	.58	.62	.65	.67	.69	.71	.74	.76
45.	.40	.50	.56	.61	.64	.67	.69	.71	.73	.75	.77
50.	.45	.53	.59	.63	.67	.69	.71	.73	.74	.76	.78
55.	.49	.57	.62	.66	.69	.71	.73	.75	.76	.78	.79
60.	.54	.61	.65	.69	.71	.73	.75	.76	.77	.79	.80
65.	.58	.64	.68	.71	.74	.75	.77	.78	.79	.80	.82
70.	.63	.68	.72	.74	.76	.77	.79	.80	.80	.82	.83
75.	.67	.72	.75	.77	.78	.80	.81	.81	.82	.83	.84
80.	.72	.75	.78	.79	.81	.82	.82	.83	.84	.85	.85
85.	.76	.79	.81	.82	.83	.84	.84	.85	.85	.86	.86
90.	.81	.83	.84	.85	.85	.86	.86	.87	.87	.88	.88
95.	.86	.86	.87	.87	.88	.88	.88	.88	.88	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 40

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.18	.30	.39	.45	.50	.54	.57	.60	.64	.67
5.	.04	.22	.33	.41	.47	.52	.56	.59	.62	.66	.69
10.	.09	.25	.36	.44	.49	.54	.58	.61	.63	.67	.70
15.	.13	.29	.39	.46	.52	.56	.59	.62	.64	.68	.71
20.	.18	.32	.42	.49	.54	.58	.61	.64	.66	.69	.72
25.	.22	.36	.45	.51	.56	.60	.63	.65	.68	.71	.73
30.	.27	.40	.48	.54	.59	.62	.65	.67	.69	.72	.74
35.	.31	.43	.51	.57	.61	.64	.67	.69	.71	.73	.75
40.	.36	.47	.54	.59	.63	.66	.68	.70	.72	.75	.76
45.	.40	.50	.57	.62	.65	.68	.70	.72	.74	.76	.78
50.	.45	.54	.60	.64	.67	.70	.72	.74	.75	.77	.79
55.	.49	.58	.63	.67	.70	.72	.74	.75	.76	.78	.80
60.	.54	.61	.66	.69	.72	.74	.76	.77	.79	.80	.81
65.	.58	.65	.69	.72	.74	.76	.77	.79	.80	.81	.82
70.	.63	.68	.72	.75	.77	.78	.79	.80	.81	.82	.83
75.	.67	.72	.75	.77	.79	.80	.81	.82	.83	.84	.84
80.	.72	.76	.78	.80	.81	.82	.83	.84	.85	.86	.86
85.	.76	.79	.81	.82	.83	.84	.85	.85	.86	.86	.87
90.	.81	.83	.84	.85	.86	.86	.86	.87	.87	.87	.88
95.	.86	.86	.87	.87	.88	.88	.88	.88	.88	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 42

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.19	.32	.40	.47	.52	.56	.59	.62	.66	.69
5.	.04	.23	.35	.43	.49	.54	.57	.61	.63	.67	.70
10.	.09	.26	.38	.45	.51	.56	.59	.62	.64	.68	.71
15.	.13	.30	.40	.48	.53	.58	.61	.64	.66	.69	.72
20.	.18	.33	.43	.50	.55	.59	.63	.65	.67	.71	.73
25.	.22	.37	.46	.53	.58	.61	.64	.67	.69	.72	.73
30.	.27	.40	.49	.55	.60	.63	.66	.68	.70	.73	.75
35.	.31	.44	.52	.58	.62	.65	.68	.70	.72	.74	.76
40.	.36	.48	.55	.60	.64	.67	.69	.71	.73	.75	.77
45.	.40	.51	.58	.63	.66	.69	.71	.73	.74	.77	.79
50.	.45	.55	.61	.65	.68	.71	.73	.75	.76	.79	.80
55.	.49	.58	.64	.68	.71	.73	.75	.76	.77	.79	.80
60.	.54	.62	.67	.70	.73	.75	.76	.78	.79	.80	.82
65.	.58	.65	.70	.73	.75	.77	.78	.79	.80	.82	.83
70.	.63	.69	.73	.75	.77	.79	.80	.81	.81	.83	.84
75.	.67	.72	.75	.77	.79	.80	.81	.82	.83	.84	.85
80.	.72	.76	.78	.80	.81	.82	.83	.84	.84	.85	.86
85.	.76	.79	.81	.83	.84	.84	.85	.85	.86	.86	.87
90.	.81	.83	.84	.85	.86	.86	.86	.87	.87	.88	.88
95.	.86	.86	.87	.87	.88	.88	.88	.88	.88	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENT CURVE DATA

RCFC & WCD

HYDROLOGY MANUAL

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 44

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.20	.33	.42	.49	.54	.57	.61	.63	.67	.70
5.	.04	.24	.36	.45	.51	.55	.59	.62	.65	.68	.71
10.	.09	.27	.39	.47	.53	.57	.61	.64	.66	.69	.72
15.	.13	.31	.42	.49	.55	.59	.62	.65	.67	.71	.73
20.	.18	.34	.45	.52	.57	.61	.64	.66	.69	.72	.74
25.	.22	.38	.48	.54	.59	.63	.66	.68	.70	.73	.75
30.	.27	.41	.50	.57	.61	.65	.67	.69	.71	.74	.76
35.	.31	.45	.53	.59	.63	.66	.69	.71	.73	.75	.77
40.	.36	.48	.56	.61	.65	.68	.70	.72	.74	.76	.78
45.	.40	.52	.59	.64	.67	.70	.72	.74	.75	.77	.79
50.	.45	.55	.62	.66	.69	.72	.74	.75	.77	.79	.80
55.	.49	.59	.65	.69	.71	.74	.75	.77	.78	.80	.81
60.	.54	.62	.67	.71	.73	.75	.77	.78	.79	.81	.82
65.	.58	.66	.70	.73	.76	.77	.79	.80	.81	.82	.83
70.	.63	.69	.73	.76	.78	.79	.80	.81	.82	.83	.84
75.	.67	.73	.76	.78	.80	.81	.82	.83	.83	.84	.85
80.	.72	.76	.79	.80	.82	.83	.83	.84	.85	.85	.86
85.	.76	.80	.82	.83	.84	.85	.85	.86	.86	.87	.87
90.	.81	.83	.84	.85	.86	.86	.87	.87	.87	.88	.88
95.	.86	.87	.87	.88	.88	.88	.88	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 48

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.23	.37	.46	.52	.57	.61	.64	.66	.70	.73
5.	.04	.26	.39	.48	.54	.59	.62	.65	.67	.71	.73
10.	.09	.30	.42	.50	.56	.60	.64	.66	.69	.72	.74
15.	.13	.33	.45	.52	.58	.62	.65	.68	.70	.73	.75
20.	.18	.37	.47	.55	.60	.64	.67	.69	.71	.74	.76
25.	.22	.40	.50	.57	.62	.65	.68	.70	.72	.75	.77
30.	.27	.43	.53	.59	.64	.67	.70	.72	.73	.76	.78
35.	.31	.47	.55	.61	.65	.69	.71	.73	.74	.77	.79
40.	.36	.50	.58	.64	.67	.70	.72	.74	.76	.78	.80
45.	.40	.53	.61	.66	.69	.72	.74	.76	.77	.79	.80
50.	.45	.57	.63	.68	.71	.74	.75	.77	.78	.80	.81
55.	.49	.60	.66	.70	.73	.75	.77	.78	.79	.81	.82
60.	.54	.63	.69	.72	.75	.77	.78	.79	.80	.82	.83
65.	.58	.67	.71	.75	.77	.78	.80	.81	.82	.83	.84
70.	.63	.70	.74	.77	.79	.80	.81	.82	.83	.84	.85
75.	.67	.73	.77	.79	.81	.82	.83	.83	.84	.85	.86
80.	.72	.77	.79	.81	.82	.83	.84	.85	.85	.86	.87
85.	.76	.80	.82	.83	.84	.85	.86	.86	.86	.87	.87
90.	.81	.83	.85	.86	.86	.87	.87	.87	.87	.88	.88
95.	.86	.87	.87	.88	.88	.88	.89	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENT

CURVE DATA

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 46

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.22	.35	.44	.50	.55	.59	.62	.65	.69	.71
5.	.04	.25	.38	.46	.52	.57	.61	.64	.66	.70	.72
10.	.09	.29	.41	.49	.54	.59	.62	.65	.67	.71	.73
15.	.13	.32	.43	.51	.56	.61	.64	.66	.68	.72	.74
20.	.18	.35	.46	.53	.58	.62	.65	.68	.70	.73	.75
25.	.22	.39	.49	.56	.60	.64	.67	.69	.71	.74	.76
30.	.27	.42	.52	.58	.62	.66	.68	.71	.72	.75	.77
35.	.31	.46	.54	.60	.64	.67	.70	.72	.74	.76	.78
40.	.36	.49	.57	.62	.66	.69	.71	.73	.75	.77	.79
45.	.40	.52	.60	.65	.68	.71	.73	.75	.76	.78	.80
50.	.45	.56	.63	.67	.70	.73	.75	.76	.77	.79	.81
55.	.49	.59	.65	.69	.72	.74	.76	.77	.79	.80	.82
60.	.54	.63	.68	.72	.74	.76	.78	.79	.80	.81	.83
65.	.58	.66	.71	.74	.76	.78	.79	.80	.81	.82	.83
70.	.63	.70	.74	.76	.78	.80	.81	.82	.82	.84	.84
75.	.67	.73	.76	.79	.80	.81	.82	.83	.84	.85	.85
80.	.72	.76	.79	.81	.82	.83	.84	.84	.85	.86	.86
85.	.76	.80	.82	.83	.84	.85	.85	.86	.86	.87	.87
90.	.81	.83	.85	.85	.86	.86	.87	.87	.87	.88	.88
95.	.86	.87	.87	.88	.88	.88	.88	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 50

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.25	.39	.48	.54	.59	.62	.65	.67	.71	.74
5.	.04	.28	.41	.50	.56	.60	.64	.66	.69	.72	.74
10.	.09	.31	.44	.52	.58	.62	.65	.68	.70	.73	.75
15.	.13	.34	.46	.54	.59	.63	.66	.69	.71	.74	.76
20.	.18	.38	.49	.56	.61	.65	.68	.70	.72	.75	.77
25.	.22	.41	.51	.58	.63	.67	.69	.71	.73	.76	.78
30.	.27	.44	.54	.60	.65	.68	.71	.73	.74	.77	.79
35.	.31	.47	.57	.62	.67	.70	.72	.74	.75	.78	.79
40.	.36	.51	.59	.65	.68	.71	.73	.75	.76	.79	.80
45.	.40	.54	.62	.67	.70	.73	.75	.76	.78	.80	.81
50.	.45	.57	.64	.69	.72	.74	.76	.77	.79	.81	.82
55.	.49	.61	.67	.71	.74	.76	.77	.79	.80	.81	.82
60.	.54	.64	.69	.73	.76	.77	.79	.80	.81	.82	.83
65.	.58	.67	.72	.75	.77	.79	.80	.81	.82	.83	.84
70.	.63	.70	.75	.77	.79	.81	.82	.83	.83	.84	.85
75.	.67	.74	.77	.80	.82	.83	.84	.84	.85	.86	.86
80.	.72	.77	.80	.82	.83	.84	.84	.85	.85	.86	.87
85.	.76	.80	.82	.84	.85	.85	.86	.86	.87	.87	.88
90.	.81	.83	.85	.86	.86	.87	.87	.87	.88	.88	.88
95.	.86	.87	.87	.88	.88	.88	.89	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RCFC & WCD

HYDROLOGY MANUAL

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 52

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.26	.40	.49	.56	.60	.64	.67	.69	.72	.75
5.	.04	.29	.43	.51	.57	.62	.65	.68	.70	.73	.75
10.	.09	.32	.45	.53	.59	.63	.66	.69	.71	.74	.76
15.	.13	.36	.48	.56	.61	.65	.68	.70	.72	.75	.77
20.	.18	.39	.50	.58	.63	.66	.69	.71	.73	.76	.78
25.	.22	.42	.53	.60	.64	.68	.70	.72	.74	.77	.79
30.	.27	.45	.55	.62	.66	.69	.72	.74	.75	.78	.79
35.	.31	.48	.58	.64	.68	.71	.73	.75	.76	.78	.80
40.	.36	.52	.60	.66	.69	.72	.74	.76	.77	.79	.81
45.	.40	.55	.63	.68	.71	.74	.76	.77	.78	.80	.82
50.	.45	.58	.65	.70	.73	.75	.77	.78	.79	.81	.82
55.	.49	.61	.68	.72	.75	.77	.78	.79	.80	.82	.83
60.	.54	.64	.70	.74	.76	.78	.80	.81	.82	.83	.84
65.	.58	.68	.73	.76	.78	.80	.81	.82	.83	.84	.85
70.	.63	.71	.75	.78	.80	.81	.82	.83	.84	.85	.86
75.	.67	.74	.78	.80	.81	.83	.83	.84	.85	.86	.87
80.	.72	.77	.80	.82	.83	.84	.85	.85	.86	.86	.87
85.	.76	.80	.83	.84	.85	.86	.86	.86	.87	.87	.88
90.	.81	.84	.85	.86	.87	.87	.87	.88	.88	.88	.88
95.	.86	.87	.88	.88	.88	.89	.89	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 54

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.28	.42	.51	.57	.62	.65	.68	.70	.73	.76
5.	.04	.31	.45	.53	.59	.63	.67	.69	.71	.74	.76
10.	.09	.34	.47	.55	.61	.65	.68	.70	.73	.75	.77
15.	.13	.37	.49	.57	.62	.66	.69	.71	.73	.76	.78
20.	.18	.40	.52	.59	.64	.68	.70	.72	.74	.77	.79
25.	.22	.43	.54	.61	.66	.69	.71	.73	.75	.78	.79
30.	.27	.46	.56	.63	.67	.70	.73	.75	.76	.78	.80
35.	.31	.49	.59	.65	.69	.72	.74	.76	.77	.79	.81
40.	.36	.53	.61	.67	.70	.73	.75	.77	.78	.80	.81
45.	.40	.56	.64	.69	.72	.75	.76	.78	.79	.81	.82
50.	.45	.59	.66	.71	.74	.76	.77	.79	.80	.82	.83
55.	.49	.62	.68	.73	.75	.77	.79	.80	.81	.83	.84
60.	.54	.65	.71	.74	.77	.79	.80	.81	.82	.83	.84
65.	.58	.68	.73	.76	.79	.80	.81	.82	.83	.84	.85
70.	.63	.71	.76	.78	.80	.82	.83	.84	.85	.86	.86
75.	.67	.74	.78	.80	.82	.83	.84	.85	.86	.86	.87
80.	.72	.78	.80	.82	.83	.84	.85	.86	.86	.87	.87
85.	.76	.81	.83	.84	.85	.86	.86	.87	.87	.88	.88
90.	.81	.84	.85	.86	.87	.87	.88	.88	.88	.88	.89
95.	.86	.87	.88	.88	.88	.89	.89	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 56

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.29	.44	.53	.59	.63	.67	.69	.71	.74	.77
5.	.04	.32	.46	.55	.61	.65	.68	.70	.72	.75	.77
10.	.09	.35	.49	.57	.62	.66	.69	.71	.73	.76	.78
15.	.13	.38	.51	.59	.64	.67	.70	.72	.74	.77	.79
20.	.18	.41	.53	.60	.65	.69	.71	.73	.75	.78	.79
25.	.22	.44	.55	.62	.67	.70	.73	.74	.76	.78	.80
30.	.27	.47	.58	.64	.68	.71	.74	.75	.77	.79	.81
35.	.31	.50	.60	.66	.70	.73	.75	.77	.78	.80	.81
40.	.36	.53	.62	.68	.71	.74	.76	.78	.79	.81	.82
45.	.40	.56	.65	.70	.73	.75	.77	.79	.80	.81	.83
50.	.45	.60	.67	.71	.75	.77	.78	.79	.80	.81	.83
55.	.49	.63	.69	.73	.76	.78	.80	.81	.82	.83	.84
60.	.54	.66	.72	.75	.78	.79	.81	.82	.83	.84	.85
65.	.58	.69	.74	.77	.79	.81	.82	.83	.83	.85	.85
70.	.63	.72	.76	.79	.81	.82	.83	.84	.84	.85	.86
75.	.67	.75	.78	.81	.82	.83	.84	.85	.85	.86	.87
80.	.72	.78	.81	.83	.84	.85	.85	.86	.86	.87	.87
85.	.76	.81	.83	.84	.85	.86	.86	.87	.87	.88	.88
90.	.81	.84	.85	.86	.87	.87	.88	.88	.88	.88	.89
95.	.86	.87	.88	.88	.88	.89	.89	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 58

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.31	.46	.55	.61	.65	.68	.71	.73	.75	.78
5.	.04	.34	.48	.57	.62	.66	.69	.72	.73	.76	.78
10.	.09	.37	.50	.58	.64	.67	.70	.72	.74	.77	.79
15.	.13	.40	.52	.60	.65	.69	.71	.73	.75	.78	.79
20.	.18	.43	.55	.62	.67	.70	.72	.74	.76	.78	.80
25.	.22	.46	.57	.64	.68	.71	.74	.75	.77	.79	.81
30.	.27	.48	.59	.65	.69	.72	.75	.76	.78	.80	.81
35.	.31	.51	.61	.67	.71	.74	.76	.77	.79	.81	.83
40.	.36	.54	.63	.69	.72	.75	.77	.78	.79	.80	.83
45.	.40	.57	.66	.71	.74	.76	.78	.79	.80	.82	.83
50.	.45	.60	.68	.72	.75	.77	.79	.80	.81	.82	.83
55.	.49	.63	.70	.74	.77	.79	.80	.81	.82	.83	.84
60.	.54	.66	.72	.76	.78	.80	.81	.82	.83	.84	.85
65.	.58	.69	.75	.78	.80	.81	.82	.83	.84	.85	.86
70.	.63	.72	.77	.79	.81	.82	.83	.84	.85	.86	.86
75.	.67	.75	.79	.81	.83	.84	.85	.85	.86	.86	.87
80.	.72	.78	.81	.83	.84	.85	.86	.86	.86	.87	.88
85.	.76	.81	.83	.85	.86	.86	.87	.87	.87	.88	.88
90.	.81	.84	.86	.86	.87	.87	.88	.88	.88	.88	.89
95.	.86	.87	.88	.88	.88	.89	.89	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENT

CURVE DATA

RCFC & WCD HYDROLOGY MANUAL

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 60

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.32	.48	.57	.62	.66	.69	.72	.74	.76	.78
5.	.04	.35	.50	.58	.64	.68	.70	.73	.74	.77	.79
10.	.09	.38	.52	.60	.65	.69	.71	.74	.75	.78	.80
15.	.13	.41	.54	.62	.66	.70	.73	.75	.76	.78	.80
20.	.18	.44	.56	.63	.68	.71	.74	.75	.77	.79	.81
25.	.22	.47	.58	.65	.69	.72	.75	.76	.78	.80	.81
30.	.27	.50	.60	.67	.71	.73	.76	.77	.79	.80	.82
35.	.31	.53	.62	.68	.72	.75	.77	.79	.80	.81	.83
40.	.36	.55	.65	.70	.73	.76	.78	.79	.80	.82	.83
45.	.40	.58	.67	.72	.75	.77	.79	.80	.81	.83	.84
50.	.45	.61	.69	.73	.76	.78	.80	.81	.82	.83	.84
55.	.49	.64	.71	.75	.78	.80	.81	.82	.83	.84	.85
60.	.54	.67	.73	.77	.79	.81	.82	.83	.83	.85	.85
65.	.58	.70	.75	.78	.80	.82	.83	.84	.84	.85	.86
70.	.63	.73	.77	.80	.82	.83	.84	.85	.85	.86	.87
75.	.67	.76	.79	.82	.83	.84	.85	.85	.86	.87	.88
80.	.72	.78	.82	.83	.84	.85	.85	.86	.86	.87	.88
85.	.76	.81	.84	.85	.86	.86	.87	.87	.88	.88	.89
90.	.81	.84	.86	.87	.87	.88	.88	.88	.88	.89	.89
95.	.86	.87	.88	.88	.89	.89	.89	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 62

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.34	.50	.58	.64	.68	.71	.73	.75	.77	.79
5.	.04	.37	.52	.60	.65	.69	.72	.74	.75	.77	.80
10.	.09	.40	.54	.61	.67	.70	.73	.75	.76	.79	.81
15.	.13	.43	.56	.63	.68	.71	.74	.76	.77	.79	.81
20.	.18	.45	.58	.65	.69	.72	.75	.76	.78	.80	.81
25.	.22	.48	.60	.66	.70	.73	.76	.77	.79	.81	.82
30.	.27	.51	.62	.68	.72	.74	.77	.78	.79	.81	.82
35.	.31	.54	.64	.69	.73	.76	.77	.79	.80	.82	.83
40.	.36	.56	.66	.71	.74	.77	.78	.79	.80	.82	.83
45.	.40	.59	.68	.73	.76	.78	.79	.81	.82	.83	.84
50.	.45	.62	.70	.74	.77	.79	.80	.81	.82	.84	.85
55.	.49	.65	.72	.76	.78	.80	.81	.82	.83	.84	.85
60.	.54	.68	.74	.77	.80	.81	.82	.83	.84	.85	.86
65.	.58	.70	.76	.79	.81	.82	.83	.84	.85	.86	.86
70.	.63	.73	.78	.80	.82	.83	.84	.85	.85	.86	.87
75.	.67	.76	.80	.82	.83	.84	.85	.86	.86	.87	.87
80.	.72	.79	.82	.84	.85	.86	.86	.87	.87	.88	.88
85.	.76	.82	.84	.85	.86	.86	.87	.87	.88	.88	.88
90.	.81	.84	.86	.87	.87	.88	.88	.88	.88	.89	.89
95.	.86	.87	.88	.88	.89	.89	.89	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 64

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.36	.51	.60	.65	.69	.72	.74	.76	.78	.80
5.	.04	.39	.53	.61	.67	.70	.73	.75	.76	.79	.80
10.	.09	.41	.55	.63	.68	.71	.74	.76	.77	.79	.81
15.	.13	.44	.57	.64	.69	.72	.75	.76	.78	.80	.81
20.	.18	.47	.59	.66	.70	.73	.76	.77	.79	.81	.82
25.	.22	.50	.61	.67	.72	.74	.76	.78	.79	.81	.82
30.	.27	.52	.63	.69	.73	.75	.77	.79	.80	.82	.83
35.	.31	.55	.65	.70	.74	.76	.78	.80	.81	.82	.83
40.	.36	.58	.67	.72	.75	.78	.79	.80	.81	.83	.84
45.	.40	.60	.69	.74	.76	.79	.80	.81	.82	.84	.85
50.	.45	.63	.71	.75	.78	.80	.81	.82	.83	.84	.85
55.	.49	.66	.73	.76	.79	.81	.82	.83	.84	.85	.86
60.	.54	.68	.75	.78	.80	.82	.83	.84	.84	.85	.86
65.	.58	.71	.76	.79	.81	.83	.84	.85	.85	.86	.87
70.	.63	.74	.78	.81	.83	.84	.85	.85	.86	.86	.87
75.	.67	.76	.80	.82	.84	.85	.86	.86	.86	.87	.88
80.	.72	.79	.82	.84	.85	.86	.86	.87	.87	.88	.88
85.	.76	.82	.84	.86	.86	.87	.87	.88	.88	.88	.88
90.	.81	.85	.86	.87	.88	.88	.88	.88	.88	.89	.89
95.	.86	.87	.88	.88	.89	.89	.89	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 66

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.38	.53	.62	.67	.71	.73	.75	.77	.79	.81
5.	.04	.41	.55	.63	.68	.72	.74	.76	.77	.80	.81
10.	.09	.43	.57	.65	.69	.73	.75	.77	.78	.80	.82
15.	.13	.46	.59	.66	.70	.74	.76	.77	.79	.81	.82
20.	.18	.48	.61	.67	.72	.74	.77	.78	.79	.81	.83
25.	.22	.51	.63	.69	.73	.75	.77	.79	.80	.82	.83
30.	.27	.54	.64	.70	.74	.76	.78	.80	.81	.82	.84
35.	.31	.56	.66	.72	.75	.77	.79	.80	.81	.83	.84
40.	.36	.59	.68	.73	.76	.78	.80	.81	.82	.83	.84
45.	.40	.61	.70	.74	.77	.79	.80	.81	.82	.83	.84
50.	.45	.64	.72	.76	.78	.80	.82	.83	.83	.85	.85
55.	.49	.67	.74	.77	.80	.81	.82	.83	.84	.85	.86
60.	.54	.69	.75	.79	.81	.82	.83	.84	.85	.86	.86
65.	.58	.72	.77	.80	.82	.83	.84	.85	.85	.86	.87
70.	.63	.74	.79	.82	.83	.84	.85	.86	.86	.87	.87
75.	.67	.77	.81	.83	.84	.85	.86	.86	.86	.87	.88
80.	.72	.80	.83	.84	.85	.86	.86	.87	.87	.88	.88
85.	.76	.82	.85	.86	.87	.87	.87	.88	.88	.88	.89
90.	.81	.85	.86	.87	.88	.88	.88	.88	.88	.89	.89
95.	.86	.87	.88	.88	.89	.89	.89	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENT CURVE DATA

RCFC & WCD

HYDROLOGY MANUAL

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 68

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.40	.55	.63	.69	.72	.74	.76	.78	.80	.81
5.	.04	.42	.57	.65	.70	.73	.75	.77	.79	.80	.82
10.	.09	.45	.59	.66	.71	.74	.76	.78	.79	.81	.82
15.	.13	.47	.61	.67	.72	.75	.77	.78	.80	.81	.83
20.	.18	.50	.62	.69	.73	.76	.78	.79	.80	.82	.83
25.	.22	.52	.64	.70	.74	.76	.78	.80	.81	.82	.84
30.	.27	.55	.66	.71	.75	.77	.79	.80	.81	.83	.84
35.	.31	.57	.67	.73	.76	.78	.80	.81	.82	.83	.84
40.	.36	.60	.69	.74	.77	.79	.81	.82	.83	.84	.85
45.	.40	.62	.71	.75	.78	.80	.81	.82	.83	.84	.85
50.	.45	.65	.73	.77	.79	.81	.82	.83	.84	.85	.86
55.	.49	.67	.74	.78	.80	.82	.83	.84	.85	.85	.86
60.	.54	.70	.76	.79	.81	.83	.84	.85	.85	.86	.87
65.	.58	.72	.78	.81	.82	.84	.85	.85	.85	.86	.87
70.	.63	.75	.80	.82	.84	.85	.85	.86	.86	.87	.87
75.	.67	.77	.81	.83	.85	.85	.86	.87	.87	.87	.88
80.	.72	.80	.83	.85	.86	.86	.87	.87	.88	.88	.88
85.	.76	.82	.85	.86	.87	.87	.88	.88	.88	.88	.89
90.	.81	.85	.87	.87	.88	.88	.88	.88	.89	.89	.89
95.	.86	.87	.88	.89	.89	.89	.89	.89	.89	.89	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 70

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.42	.57	.65	.70	.73	.76	.77	.79	.81	.82
5.	.04	.44	.59	.66	.71	.74	.76	.77	.79	.81	.83
10.	.09	.47	.61	.68	.72	.75	.77	.79	.80	.82	.83
15.	.13	.49	.62	.69	.73	.76	.78	.79	.80	.82	.83
20.	.18	.52	.64	.70	.74	.77	.79	.80	.81	.83	.84
25.	.22	.54	.65	.71	.75	.77	.79	.81	.82	.83	.84
30.	.27	.56	.67	.73	.76	.78	.80	.81	.82	.84	.85
35.	.31	.59	.69	.74	.77	.79	.81	.82	.83	.84	.85
40.	.36	.61	.70	.75	.78	.80	.81	.82	.83	.84	.85
45.	.40	.64	.72	.76	.79	.81	.82	.83	.84	.85	.86
50.	.45	.66	.74	.78	.80	.82	.83	.84	.84	.85	.86
55.	.49	.68	.75	.79	.81	.82	.84	.84	.84	.85	.86
60.	.54	.71	.77	.80	.82	.83	.84	.85	.86	.86	.87
65.	.58	.73	.79	.81	.83	.84	.85	.86	.86	.87	.88
70.	.63	.76	.80	.83	.84	.85	.86	.86	.87	.87	.88
75.	.67	.78	.82	.84	.85	.86	.86	.87	.87	.88	.88
80.	.72	.83	.85	.86	.87	.87	.87	.87	.88	.88	.88
85.	.76	.83	.85	.86	.87	.87	.88	.88	.88	.89	.89
90.	.81	.85	.87	.88	.88	.88	.88	.89	.89	.89	.89
95.	.86	.88	.88	.89	.89	.89	.89	.89	.89	.89	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 72

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.44	.59	.67	.71	.75	.77	.78	.80	.82	.83
5.	.04	.46	.61	.68	.72	.75	.77	.79	.80	.82	.83
10.	.09	.49	.62	.69	.73	.76	.78	.80	.81	.82	.84
15.	.13	.51	.64	.70	.74	.77	.79	.80	.81	.83	.84
20.	.18	.53	.65	.72	.75	.78	.79	.81	.82	.83	.84
25.	.22	.56	.67	.73	.76	.78	.80	.81	.82	.84	.85
30.	.27	.58	.68	.74	.77	.79	.81	.82	.83	.84	.85
35.	.31	.60	.70	.75	.78	.80	.81	.82	.83	.85	.85
40.	.36	.63	.72	.76	.79	.81	.82	.83	.84	.85	.86
45.	.40	.65	.73	.77	.80	.81	.83	.84	.84	.85	.86
50.	.45	.67	.75	.78	.81	.82	.83	.84	.85	.86	.86
55.	.49	.69	.76	.80	.82	.83	.84	.85	.85	.86	.87
60.	.54	.72	.78	.81	.83	.84	.85	.85	.86	.87	.87
65.	.58	.74	.79	.82	.84	.85	.85	.86	.86	.87	.87
70.	.63	.76	.81	.83	.84	.85	.86	.87	.87	.87	.88
75.	.67	.79	.82	.84	.85	.86	.87	.87	.87	.88	.88
80.	.72	.81	.84	.85	.86	.87	.87	.88	.88	.88	.89
85.	.76	.83	.85	.87	.87	.88	.88	.88	.88	.89	.89
90.	.81	.85	.87	.88	.88	.88	.88	.89	.89	.89	.89
95.	.86	.88	.88	.89	.89	.89	.89	.89	.89	.89	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 74

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.46	.61	.69	.73	.76	.78	.79	.81	.82	.83
5.	.04	.49	.63	.70	.74	.77	.78	.80	.81	.83	.84
10.	.09	.51	.64	.71	.75	.77	.79	.80	.82	.83	.84
15.	.13	.53	.66	.72	.75	.78	.80	.81	.82	.83	.84
20.	.18	.55	.67	.73	.76	.79	.80	.82	.82	.84	.85
25.	.22	.57	.68	.74	.77	.79	.81	.83	.83	.84	.85
30.	.27	.60	.70	.75	.78	.80	.81	.83	.83	.85	.85
35.	.31	.62	.71	.76	.79	.81	.82	.83	.84	.85	.86
40.	.36	.64	.73	.77	.80	.81	.83	.84	.84	.85	.86
45.	.40	.66	.74	.78	.81	.83	.84	.85	.85	.86	.86
50.	.45	.68	.76	.79	.81	.83	.84	.85	.85	.86	.87
55.	.49	.70	.77	.80	.82	.84	.85	.85	.86	.87	.87
60.	.54	.73	.79	.81	.83	.85	.86	.86	.87	.87	.87
65.	.58	.75	.80	.83	.85	.86	.86	.87	.87	.88	.88
70.	.63	.77	.81	.84	.85	.86	.86	.87	.87	.88	.88
75.	.67	.79	.83	.85	.86	.86	.87	.87	.87	.88	.88
80.	.72	.81	.84	.86	.87	.87	.88	.88	.88	.88	.89
85.	.76	.83	.86	.87	.87	.88	.88	.88	.88	.89	.89
90.	.81	.86	.87	.88	.88	.88	.89	.89	.89	.89	.89
95.	.86	.88	.88	.89	.89	.89	.89	.89	.89	.89	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENT

CURVE DATA

RCFC & WCD

HYDROLOGY MANUAL

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 76

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.49	.63	.70	.74	.77	.79	.80	.81	.83	.84
5.	.04	.51	.65	.71	.75	.78	.79	.81	.82	.83	.84
10.	.09	.53	.66	.72	.76	.78	.80	.81	.82	.84	.85
15.	.13	.55	.67	.73	.77	.79	.81	.82	.83	.84	.85
20.	.18	.57	.69	.74	.77	.80	.81	.82	.83	.84	.85
25.	.22	.59	.70	.75	.78	.80	.82	.83	.84	.85	.86
30.	.27	.61	.71	.76	.79	.81	.82	.83	.84	.85	.86
35.	.31	.63	.73	.77	.80	.82	.83	.84	.84	.85	.86
40.	.36	.65	.74	.78	.81	.83	.84	.85	.85	.86	.87
45.	.40	.67	.75	.79	.81	.83	.84	.85	.85	.86	.87
50.	.45	.69	.77	.80	.82	.84	.84	.85	.86	.87	.87
55.	.49	.71	.78	.81	.83	.84	.85	.86	.86	.87	.87
60.	.54	.74	.79	.82	.84	.85	.86	.86	.87	.87	.88
65.	.58	.76	.81	.83	.85	.85	.86	.87	.87	.88	.88
70.	.63	.78	.82	.84	.85	.86	.87	.87	.88	.88	.88
75.	.67	.80	.83	.85	.86	.87	.87	.88	.88	.89	.89
80.	.72	.82	.85	.86	.87	.87	.88	.88	.89	.89	.89
85.	.76	.84	.86	.87	.88	.88	.88	.89	.89	.89	.89
90.	.81	.86	.87	.88	.88	.89	.89	.89	.89	.89	.89
95.	.86	.88	.89	.89	.89	.89	.89	.90	.90	.90	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 78

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.51	.65	.72	.76	.78	.80	.81	.82	.84	.85
5.	.04	.53	.67	.73	.76	.79	.80	.82	.83	.84	.85
10.	.09	.55	.68	.74	.77	.79	.81	.82	.83	.84	.85
15.	.13	.57	.69	.75	.78	.80	.81	.83	.83	.85	.85
20.	.18	.59	.70	.76	.79	.81	.82	.83	.84	.85	.86
25.	.22	.61	.72	.76	.79	.81	.82	.83	.84	.85	.86
30.	.27	.63	.73	.77	.80	.82	.83	.84	.85	.86	.86
35.	.31	.65	.74	.78	.81	.82	.83	.84	.85	.86	.87
40.	.36	.67	.75	.79	.81	.83	.84	.85	.86	.87	.87
45.	.40	.69	.76	.80	.82	.84	.84	.85	.86	.87	.87
50.	.45	.71	.78	.81	.83	.84	.85	.86	.86	.87	.87
55.	.49	.73	.79	.82	.84	.85	.85	.86	.87	.87	.88
60.	.54	.75	.80	.83	.84	.85	.86	.86	.87	.87	.88
65.	.58	.76	.81	.84	.85	.86	.86	.87	.87	.88	.88
70.	.63	.78	.83	.85	.86	.86	.87	.87	.88	.88	.88
75.	.67	.80	.84	.85	.86	.87	.87	.88	.88	.88	.89
80.	.72	.82	.85	.86	.87	.87	.88	.88	.88	.89	.89
85.	.76	.84	.86	.87	.88	.88	.88	.89	.89	.89	.89
90.	.81	.86	.88	.88	.89	.89	.89	.89	.89	.89	.89
95.	.86	.88	.89	.89	.89	.89	.89	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 80

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.54	.67	.74	.77	.79	.81	.82	.83	.84	.85
5.	.04	.56	.69	.74	.78	.80	.81	.83	.83	.85	.86
10.	.09	.58	.70	.75	.78	.80	.82	.83	.84	.85	.86
15.	.13	.59	.71	.76	.79	.81	.82	.83	.84	.85	.86
20.	.18	.61	.72	.77	.80	.82	.83	.84	.84	.86	.86
25.	.22	.63	.73	.78	.80	.82	.83	.84	.85	.86	.86
30.	.27	.65	.74	.79	.81	.83	.84	.85	.85	.86	.87
35.	.31	.67	.75	.79	.82	.83	.84	.85	.86	.86	.87
40.	.36	.68	.76	.80	.82	.84	.85	.85	.86	.87	.87
45.	.40	.70	.78	.81	.83	.84	.85	.86	.86	.87	.87
50.	.45	.72	.79	.82	.84	.85	.86	.86	.87	.87	.88
55.	.49	.74	.80	.83	.84	.85	.86	.86	.87	.87	.88
60.	.54	.76	.81	.83	.85	.86	.86	.87	.87	.88	.88
65.	.58	.77	.82	.84	.86	.86	.87	.87	.88	.88	.88
70.	.63	.79	.83	.85	.86	.87	.87	.88	.88	.88	.89
75.	.67	.81	.86	.86	.87	.87	.88	.88	.88	.89	.89
80.	.72	.83	.86	.87	.87	.88	.88	.88	.89	.89	.89
85.	.76	.85	.87	.88	.88	.88	.88	.89	.89	.89	.89
90.	.81	.86	.88	.88	.88	.89	.89	.89	.89	.89	.89
95.	.86	.88	.89	.89	.89	.89	.89	.90	.90	.90	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 82

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.57	.70	.75	.79	.81	.82	.83	.84	.85	.86
5.	.04	.58	.71	.76	.79	.81	.82	.83	.84	.85	.86
10.	.09	.60	.72	.77	.80	.82	.83	.84	.84	.86	.86
15.	.13	.62	.73	.78	.80	.82	.83	.84	.85	.86	.86
20.	.18	.63	.74	.78	.81	.82	.84	.84	.85	.86	.87
25.	.22	.65	.75	.79	.81	.83	.84	.85	.85	.86	.87
30.	.27	.67	.76	.80	.82	.83	.84	.85	.86	.87	.87
35.	.31	.68	.77	.80	.83	.84	.85	.85	.86	.87	.87
40.	.36	.70	.78	.81	.83	.84	.85	.86	.86	.87	.87
45.	.40	.72	.79	.82	.84	.85	.86	.86	.87	.87	.88
50.	.45	.73	.80	.83	.84	.85	.86	.86	.87	.87	.88
55.	.49	.75	.81	.83	.85	.86	.86	.87	.87	.88	.88
60.	.54	.77	.82	.84	.85	.86	.87	.87	.88	.88	.88
65.	.58	.78	.83	.85	.86	.87	.87	.88	.88	.88	.89
70.	.63	.80	.84	.86	.87	.87	.88	.88	.88	.89	.89
75.	.67	.82	.85	.86	.87	.88	.88	.88	.88	.89	.89
80.	.72	.83	.86	.87	.88	.88	.88	.88	.88	.89	.89
85.	.76	.85	.87	.88	.88	.88	.88	.89	.89	.89	.89
90.	.81	.87	.88	.88	.89	.89	.89	.89	.89	.89	.89
95.	.86	.88	.89	.89	.89	.89	.89	.89	.89	.89	.89
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENT CURVE DATA

RCFC & WCD HYDROLOGY MANUAL

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 84

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.60	.72	.77	.80	.82	.83	.84	.85	.86	.86
5.	.04	.61	.73	.78	.80	.82	.83	.84	.85	.86	.87
10.	.09	.63	.74	.78	.81	.83	.84	.85	.85	.86	.87
15.	.13	.64	.75	.79	.81	.83	.84	.85	.85	.86	.87
20.	.18	.66	.76	.80	.82	.83	.84	.85	.86	.87	.87
25.	.22	.67	.77	.80	.82	.84	.85	.85	.86	.87	.87
30.	.27	.69	.77	.81	.83	.84	.85	.86	.86	.87	.87
35.	.31	.70	.78	.82	.83	.85	.85	.86	.87	.87	.88
40.	.36	.72	.79	.82	.84	.85	.86	.86	.87	.87	.88
45.	.40	.73	.80	.83	.84	.85	.86	.86	.87	.87	.88
50.	.45	.75	.81	.83	.85	.86	.86	.87	.87	.88	.88
55.	.49	.76	.82	.84	.85	.86	.87	.87	.88	.88	.89
60.	.54	.78	.83	.85	.86	.87	.87	.88	.88	.88	.89
65.	.58	.79	.84	.85	.86	.87	.88	.88	.88	.88	.89
70.	.63	.81	.85	.86	.87	.88	.88	.88	.88	.89	.89
75.	.67	.82	.85	.87	.87	.88	.88	.88	.89	.89	.89
80.	.72	.84	.86	.87	.88	.88	.89	.89	.89	.89	.89
85.	.76	.85	.87	.88	.88	.89	.89	.89	.89	.89	.90
90.	.81	.87	.88	.89	.89	.89	.89	.89	.89	.90	.90
95.	.86	.88	.89	.89	.89	.90	.90	.90	.90	.90	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 86

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.63	.74	.79	.81	.83	.84	.85	.85	.86	.87
5.	.04	.64	.75	.79	.82	.83	.84	.85	.85	.86	.87
10.	.09	.65	.76	.80	.82	.84	.85	.85	.86	.87	.87
15.	.13	.67	.76	.80	.83	.84	.85	.86	.86	.87	.87
20.	.18	.68	.77	.81	.83	.84	.85	.86	.86	.87	.87
25.	.22	.70	.78	.81	.83	.85	.85	.86	.87	.87	.88
30.	.27	.71	.79	.82	.84	.85	.86	.86	.87	.87	.88
35.	.31	.72	.80	.83	.84	.85	.86	.86	.87	.87	.88
40.	.36	.74	.80	.83	.85	.86	.86	.87	.87	.88	.88
45.	.40	.75	.81	.84	.85	.86	.87	.87	.87	.88	.88
50.	.45	.76	.82	.84	.86	.86	.87	.87	.88	.88	.88
55.	.49	.78	.83	.85	.86	.87	.87	.88	.88	.88	.89
60.	.54	.79	.84	.85	.86	.87	.88	.88	.88	.89	.89
65.	.58	.80	.84	.86	.87	.87	.88	.88	.88	.89	.89
70.	.63	.82	.85	.87	.88	.88	.88	.88	.89	.89	.89
75.	.67	.83	.86	.87	.88	.88	.88	.89	.89	.89	.89
80.	.72	.85	.87	.88	.88	.89	.89	.89	.89	.89	.90
85.	.76	.86	.88	.88	.89	.89	.89	.89	.89	.90	.90
90.	.81	.87	.88	.88	.89	.89	.89	.89	.90	.90	.90
95.	.86	.89	.89	.89	.90	.90	.90	.90	.90	.90	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

Developed Area 1-A to 3-A

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 88

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.66	.76	.80	.82	.84	.85	.86	.86	.87	.87
5.	.04	.67	.77	.81	.83	.84	.85	.86	.86	.87	.87
10.	.09	.68	.78	.81	.83	.85	.85	.86	.86	.87	.88
15.	.13	.70	.78	.82	.84	.85	.86	.86	.87	.87	.88
20.	.18	.71	.79	.82	.84	.85	.86	.86	.87	.87	.88
25.	.22	.72	.80	.83	.84	.85	.86	.86	.87	.88	.88
30.	.27	.73	.80	.83	.85	.86	.86	.87	.87	.88	.88
35.	.31	.74	.81	.84	.85	.86	.87	.87	.87	.88	.88
40.	.36	.76	.82	.84	.85	.86	.87	.87	.88	.88	.88
45.	.40	.77	.82	.85	.86	.87	.87	.88	.88	.88	.89
50.	.45	.78	.83	.85	.86	.87	.87	.88	.88	.89	.89
55.	.49	.79	.84	.86	.87	.87	.88	.88	.88	.89	.89
60.	.54	.80	.84	.86	.87	.88	.88	.88	.88	.89	.89
65.	.58	.82	.85	.87	.87	.88	.88	.88	.88	.89	.89
70.	.63	.83	.86	.87	.88	.88	.88	.88	.89	.89	.89
75.	.67	.84	.87	.88	.88	.88	.88	.89	.89	.89	.89
80.	.72	.85	.87	.88	.88	.89	.89	.89	.89	.89	.89
85.	.76	.86	.88	.89	.89	.89	.89	.89	.89	.90	.90
90.	.81	.87	.88	.89	.89	.89	.89	.89	.89	.90	.90
95.	.86	.88	.89	.89	.89	.90	.90	.90	.90	.90	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 90

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.69	.78	.82	.84	.85	.86	.86	.87	.87	.88
5.	.04	.70	.79	.82	.84	.85	.86	.87	.87	.88	.88
10.	.09	.71	.80	.83	.84	.85	.86	.87	.87	.88	.88
15.	.13	.73	.80	.83	.85	.86	.86	.87	.87	.88	.88
20.	.18	.74	.81	.84	.85	.86	.87	.87	.88	.88	.88
25.	.22	.75	.81	.84	.85	.86	.87	.87	.88	.88	.88
30.	.27	.76	.82	.84	.86	.86	.87	.87	.88	.88	.88
35.	.31	.77	.82	.85	.86	.87	.87	.88	.88	.88	.89
40.	.36	.78	.83	.85	.86	.87	.87	.88	.88	.88	.89
45.	.40	.79	.84	.86	.87	.87	.88	.88	.88	.89	.89
50.	.45	.80	.84	.86	.87	.87	.88	.88	.88	.89	.89
55.	.49	.81	.85	.86	.87	.88	.88	.88	.89	.89	.89
60.	.54	.82	.85	.87	.88	.88	.88	.89	.89	.89	.89
65.	.58	.83	.86	.87	.88	.88	.88	.89	.89	.89	.89
70.	.63	.84	.87	.88	.88	.88	.88	.89	.89	.89	.89
75.	.67	.85	.87	.88	.88	.89	.89	.89	.89	.89	.89
80.	.72	.86	.88	.88	.89	.89	.89	.89	.89	.89	.90
85.	.76	.87	.88	.89	.89	.89	.89	.89	.89	.90	.90
90.	.81	.88	.89	.89	.89	.90	.90	.90	.90	.90	.90
95.	.86	.89	.89	.89	.90	.90	.90	.90	.90	.90	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENT CURVE DATA

RCFC & WCD

HYDROLOGY MANUAL

RUNOFF COEFFICIENTS FOR PI INDEX NO. = 92

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.73	.81	.84	.85	.86	.87	.87	.87	.88	.88
5.	.04	.74	.81	.84	.85	.86	.87	.87	.87	.88	.88
10.	.09	.75	.82	.84	.86	.86	.87	.87	.87	.88	.88
15.	.13	.76	.82	.85	.86	.87	.87	.88	.88	.88	.89
20.	.18	.76	.83	.85	.86	.87	.87	.88	.88	.88	.89
25.	.22	.77	.83	.85	.86	.87	.87	.88	.88	.88	.89
30.	.27	.78	.83	.85	.87	.87	.88	.88	.88	.89	.89
35.	.31	.79	.84	.86	.87	.87	.88	.88	.88	.89	.89
40.	.36	.80	.84	.86	.87	.88	.88	.88	.88	.89	.89
45.	.40	.81	.85	.86	.87	.88	.88	.88	.89	.89	.89
50.	.45	.82	.85	.87	.88	.88	.88	.89	.89	.89	.89
55.	.49	.82	.86	.87	.88	.88	.89	.89	.89	.89	.89
60.	.54	.83	.86	.87	.88	.88	.89	.89	.89	.89	.89
65.	.58	.84	.87	.88	.88	.89	.89	.89	.89	.89	.89
70.	.63	.85	.87	.88	.88	.89	.89	.89	.89	.89	.89
75.	.67	.86	.88	.88	.89	.89	.89	.89	.89	.89	.89
80.	.72	.87	.88	.88	.89	.89	.89	.89	.89	.89	.89
85.	.76	.87	.89	.89	.89	.89	.89	.89	.89	.89	.89
90.	.81	.88	.89	.89	.89	.89	.89	.89	.89	.89	.89
95.	.86	.89	.90	.90	.90	.90	.90	.90	.90	.90	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

Existing Area 1-A to 3-A, | Developed Area 4-A to 7-A

RUNOFF COEFFICIENTS FOR PI INDEX NO. = 96

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.81	.85	.87	.88	.88	.88	.89	.89	.89	.89
5.	.04	.81	.85	.87	.88	.88	.88	.89	.89	.89	.89
10.	.09	.82	.86	.87	.88	.88	.88	.89	.89	.89	.89
15.	.13	.82	.86	.87	.88	.88	.88	.89	.89	.89	.89
20.	.18	.83	.86	.87	.88	.88	.88	.89	.89	.89	.89
25.	.22	.83	.86	.87	.88	.88	.88	.89	.89	.89	.89
30.	.27	.84	.87	.88	.88	.89	.89	.89	.89	.89	.89
35.	.31	.84	.87	.88	.88	.89	.89	.89	.89	.89	.89
40.	.36	.85	.87	.88	.88	.89	.89	.89	.89	.89	.89
45.	.40	.85	.87	.88	.88	.89	.89	.89	.89	.89	.89
50.	.45	.85	.88	.88	.89	.89	.89	.89	.89	.89	.89
55.	.49	.86	.88	.89	.89	.89	.89	.89	.89	.89	.89
60.	.54	.86	.88	.89	.89	.89	.89	.89	.89	.89	.89
65.	.58	.87	.88	.89	.89	.89	.89	.89	.89	.89	.89
70.	.63	.87	.89	.89	.89	.89	.89	.89	.89	.89	.89
75.	.67	.88	.89	.89	.89	.89	.89	.89	.89	.89	.89
80.	.72	.88	.89	.89	.89	.89	.89	.89	.89	.89	.89
85.	.76	.89	.89	.89	.89	.89	.89	.89	.89	.89	.89
90.	.81	.89	.90	.90	.90	.90	.90	.90	.90	.90	.90
95.	.86	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENT

CURVE DATA

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 94

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.77	.83	.85	.86	.87	.87	.88	.88	.88	.89
5.	.04	.78	.83	.85	.87	.87	.87	.88	.88	.88	.89
10.	.09	.78	.84	.86	.87	.87	.87	.88	.88	.88	.89
15.	.13	.79	.84	.86	.87	.87	.88	.88	.88	.88	.89
20.	.18	.80	.84	.86	.87	.88	.88	.88	.88	.89	.89
25.	.22	.80	.85	.86	.87	.88	.88	.88	.89	.89	.89
30.	.27	.81	.85	.87	.87	.88	.88	.89	.89	.89	.89
35.	.31	.81	.85	.87	.88	.88	.88	.89	.89	.89	.89
40.	.36	.82	.86	.87	.88	.88	.89	.89	.89	.89	.89
45.	.40	.83	.86	.87	.88	.88	.89	.89	.89	.89	.89
50.	.45	.83	.86	.88	.88	.89	.89	.89	.89	.89	.89
55.	.49	.84	.87	.88	.88	.89	.89	.89	.89	.89	.89
60.	.54	.85	.87	.88	.89	.89	.89	.89	.89	.89	.89
65.	.58	.85	.88	.88	.89	.89	.89	.89	.89	.89	.89
70.	.63	.86	.88	.89	.89	.89	.89	.89	.89	.89	.89
75.	.67	.87	.88	.89	.89	.89	.89	.89	.89	.89	.89
80.	.72	.87	.89	.89	.89	.89	.89	.89	.89	.89	.89
85.	.76	.88	.89	.89	.89	.89	.89	.89	.89	.89	.89
90.	.81	.89	.89	.90	.90	.90	.90	.90	.90	.90	.90
95.	.86	.89	.90	.90	.90	.90	.90	.90	.90	.90	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

RUNOFF COEFFICIENTS FOR RI INDEX NO. = 98

IMPERVIOUS PERCENT	INTENSITY - INCHES/HOUR										
	.0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	5.0	6.0
0.	.00	.85	.88	.88	.89	.89	.89	.89	.89	.89	.90
5.	.04	.86	.88	.88	.89	.89	.89	.89	.89	.89	.90
10.	.09	.86	.88	.88	.89	.89	.89	.89	.89	.89	.90
15.	.13	.86	.88	.88	.89	.89	.89	.89	.89	.89	.90
20.	.18	.86	.88	.89	.89	.89	.89	.89	.89	.89	.90
25.	.22	.87	.88	.89	.89	.89	.89	.89	.89	.89	.90
30.	.27	.87	.88	.89	.89	.89	.89	.89	.89	.89	.90
35.	.31	.87	.88	.89	.89	.89	.89	.89	.89	.89	.90
40.	.36	.87	.88	.89	.89	.89	.89	.89	.89	.89	.90
45.	.40	.87	.89	.89	.89	.89	.89	.89	.89	.89	.90
50.	.45	.88	.89	.89	.89	.89	.89	.89	.89	.89	.90
55.	.49	.88	.89	.89	.89	.89	.89	.89	.89	.89	.90
60.	.54	.88	.89	.89	.89	.89	.89	.89	.89	.89	.90
65.	.58	.88	.89	.89	.89	.89	.89	.89	.89	.89	.90
70.	.63	.89	.89	.89	.89	.89	.89	.89	.89	.89	.90
75.	.67	.89	.89	.89	.89	.89	.89	.89	.89	.89	.90
80.	.72	.89	.89	.89	.89	.89	.89	.89	.89	.89	.90
85.	.76	.89	.89	.89	.89	.89	.89	.89	.89	.89	.90
90.	.81	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
95.	.86	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90
100.	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90	.90

74LVBESLBHLVYRLGLIWKHQRHU RUHR WKHIFORRZQES
HOHQWQWRQRWDSHU EMBESLBEH IOFRGQHOHBOV
OHHQG VADHEU BSUHDWFOQDWH FQW.LGLQWILHUV
SEHQO QEU DGS SHHFWLYHGDWH OSLBHVIRU
XSSGDSGQHQGUQJGDUDVFOQRU EHXHGIUR
UHDWDRUSUSRVH



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

38455 E BENTON RD HEMET, CA



March 4, 2021

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.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
Western Riverside Area, California.....	13
ChF2—Cieneba sandy loam, 15 to 50 percent slopes, eroded.....	13
FfC2—Fallbrook fine sandy loam, 2 to 8 percent slopes, eroded.....	14
FkD2—Fallbrook fine sandy loam, shallow, 8 to 15 percent slopes, eroded.....	15
References	17
Glossary	19

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

Custom Soil Resource Report

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



Custom Soil Resource Report

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 13, May 27, 2020

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

Date(s) aerial images were photographed: Aug 18, 2018—Aug 22, 2018

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
ChF2	Cieneba sandy loam, 15 to 50 percent slopes, eroded	1.0	15.3%
FfC2	Fallbrook fine sandy loam, 2 to 8 percent slopes, eroded	0.4	6.9%
FkD2	Fallbrook fine sandy loam, shallow, 8 to 15 percent slopes, eroded	4.9	77.8%
Totals for Area of Interest		6.4	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 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

ChF2—Cieneba sandy loam, 15 to 50 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcsc
Elevation: 500 to 4,000 feet
Mean annual precipitation: 12 to 35 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Cieneba

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 14 inches: sandy loam
H2 - 14 to 22 inches: weathered bedrock

Properties and qualities

Slope: 15 to 50 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
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
Available water capacity: Very low (about 1.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R019XD060CA - SHALLOW LOAMY (1975)
Hydric soil rating: No

Minor Components

Friant

Percent of map unit: 5 percent
Hydric soil rating: No

Fallbrook

Percent of map unit: 5 percent

Hydric soil rating: No

Vista

Percent of map unit: 5 percent

Hydric soil rating: No

FfC2—Fallbrook fine sandy loam, 2 to 8 percent slopes, eroded

Map Unit Setting

National map unit symbol: hctw

Elevation: 300 to 2,000 feet

Mean annual precipitation: 12 to 25 inches

Mean annual air temperature: 59 to 64 degrees F

Frost-free period: 200 to 280 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Fallbrook and similar soils: 85 percent

Minor components: 15 percent

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

Description of Fallbrook

Setting

Landform: Hills

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Residuum weathered from granodiorite and/or residuum weathered from tonalite

Typical profile

H1 - 0 to 14 inches: fine sandy loam

H2 - 14 to 24 inches: sandy clay loam

H3 - 24 to 28 inches: bedrock

Properties and qualities

Slope: 5 to 8 percent

Depth to restrictive feature: 20 to 40 inches to paralithic bedrock

Drainage class: Well drained

Runoff class: Medium

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

Available water capacity: Low (about 3.3 inches)

Interpretive groups

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

Minor Components

Vista

Percent of map unit: 5 percent
Hydric soil rating: No

Bonsall

Percent of map unit: 5 percent
Hydric soil rating: No

Cieneba

Percent of map unit: 5 percent
Hydric soil rating: No

FkD2—Fallbrook fine sandy loam, shallow, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: hctx
Elevation: 300 to 2,000 feet
Mean annual precipitation: 12 to 25 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Fallbrook

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from granodiorite and/or residuum weathered from tonalite

Typical profile

H1 - 0 to 6 inches: fine sandy loam
H2 - 6 to 18 inches: sandy clay loam

Custom Soil Resource Report

H3 - 18 to 22 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 10 to 20 inches to paralithic bedrock

Drainage class: Well drained

Runoff class: Medium

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

Available water capacity: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: D

Ecological site: R019XD060CA - SHALLOW LOAMY (1975)

Hydric soil rating: No

Minor Components

Bonsall

Percent of map unit: 5 percent

Hydric soil rating: No

Cieneba

Percent of map unit: 5 percent

Hydric soil rating: No

Vista

Percent of map unit: 5 percent

Hydric soil rating: No

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- 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=stelprdb1043084>

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

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the following National Soil Survey Handbook link: "[National Soil Survey Handbook](#)."

ABC soil

A soil having an A, a B, and a C horizon.

Ablation till

Loose, relatively permeable earthy material deposited during the downwasting of nearly static glacial ice, either contained within or accumulated on the surface of the glacier.

AC soil

A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil

The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil

Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone

A semiconical type of alluvial fan having very steep slopes. It is higher, narrower, and steeper than a fan and is composed of coarser and thicker layers of material deposited by a combination of alluvial episodes and (to a much lesser degree) landslides (debris flow). The coarsest materials tend to be concentrated at the apex of the cone.

Alluvial fan

A low, outspread mass of loose materials and/or rock material, commonly with gentle slopes. It is shaped like an open fan or a segment of a cone. The material was deposited by a stream at the place where it issues from a narrow mountain valley or upland valley or where a tributary stream is near or at its junction with the main stream. The fan is steepest near its apex, which points upstream, and slopes gently and convexly outward (downstream) with a gradual decrease in gradient.

Alluvium

Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Alpha,alpha-dipyridyl

A compound that when dissolved in ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction implies reducing conditions and the likely presence of redoximorphic features.

Animal unit month (AUM)

The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions

Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon

A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo

The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in unconsolidated material. It is usually dry but can be transformed into a temporary watercourse or short-lived torrent after heavy rain within the watershed.

Aspect

The direction toward which a slope faces. Also called slope aspect.

Association, soil

A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity)

The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low: 0 to 3

Low: 3 to 6

Moderate: 6 to 9

High: 9 to 12

Very high: More than 12

Backslope

The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Backswamp

A flood-plain landform. Extensive, marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces.

Badland

A landscape that is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes and narrow interfluvies. Badlands develop on surfaces that have little or no vegetative cover overlying unconsolidated or poorly cemented materials (clays, silts, or sandstones) with, in some cases, soluble minerals, such as gypsum or halite.

Bajada

A broad, gently inclined alluvial piedmont slope extending from the base of a mountain range out into a basin and formed by the lateral coalescence of a series of alluvial fans. Typically, it has a broadly undulating transverse profile, parallel to the mountain front, resulting from the convexities of component fans. The term is generally restricted to constructional slopes of intermontane basins.

Basal area

The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation

The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope (geomorphology)

A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding plane

A planar or nearly planar bedding surface that visibly separates each successive layer of stratified sediment or rock (of the same or different lithology)

from the preceding or following layer; a plane of deposition. It commonly marks a change in the circumstances of deposition and may show a parting, a color difference, a change in particle size, or various combinations of these. The term is commonly applied to any bedding surface, even one that is conspicuously bent or deformed by folding.

Bedding system

A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock

The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography

A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace

A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum

Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout (map symbol)

A saucer-, cup-, or trough-shaped depression formed by wind erosion on a preexisting dune or other sand deposit, especially in an area of shifting sand or loose soil or where protective vegetation is disturbed or destroyed. The adjoining accumulation of sand derived from the depression, where recognizable, is commonly included. Blowouts are commonly small.

Borrow pit (map symbol)

An open excavation from which soil and underlying material have been removed, usually for construction purposes.

Bottom land

An informal term loosely applied to various portions of a flood plain.

Boulders

Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks

A landscape or tract of steep, rough or broken land dissected by ravines and gullies and marking a sudden change in topography.

Breast height

An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management

Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Butte

An isolated, generally flat-topped hill or mountain with relatively steep slopes and talus or precipitous cliffs and characterized by summit width that is less than the height of bounding escarpments; commonly topped by a caprock of resistant material and representing an erosion remnant carved from flat-lying rocks.

Cable yarding

A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil

A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche

A general term for a prominent zone of secondary carbonate accumulation in surficial materials in warm, subhumid to arid areas. Caliche is formed by both geologic and pedologic processes. Finely crystalline calcium carbonate forms a nearly continuous surface-coating and void-filling medium in geologic (parent) materials. Cementation ranges from weak in nonindurated forms to very strong in indurated forms. Other minerals (e.g., carbonates, silicate, and sulfate) may occur as accessory cements. Most petrocalcic horizons and some calcic horizons are caliche.

California bearing ratio (CBR)

The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy

The leafy crown of trees or shrubs. (See Crown.)

Canyon

A long, deep, narrow valley with high, precipitous walls in an area of high local relief.

Capillary water

Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena

A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material and under similar climatic conditions but that have different characteristics as a result of differences in relief and drainage.

Cation

An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity

The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps

See Terracettes.

Cement rock

Shaly limestone used in the manufacture of cement.

Channery soil material

Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment

Control of unwanted vegetation through the use of chemicals.

Chiseling

Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Cirque

A steep-walled, semicircular or crescent-shaped, half-bowl-like recess or hollow, commonly situated at the head of a glaciated mountain valley or high on the side of a mountain. It was produced by the erosive activity of a mountain glacier. It commonly contains a small round lake (tarn).

Clay

As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions

See Redoximorphic features.

Clay film

A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clay spot (map symbol)

A spot where the surface texture is silty clay or clay in areas where the surface layer of the soils in the surrounding map unit is sandy loam, loam, silt loam, or coarser.

Claypan

A dense, compact subsoil layer that contains much more clay than the overlying materials, from which it is separated by a sharply defined boundary. The layer restricts the downward movement of water through the soil. A claypan is commonly hard when dry and plastic and sticky when wet.

Climax plant community

The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil

Sand or loamy sand.

Cobble (or cobblestone)

A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material

Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility)

See Linear extensibility.

Colluvium

Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local, unconcentrated runoff.

Complex slope

Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil

A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions

See Redoximorphic features.

Conglomerate

A coarse grained, clastic sedimentary rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system

Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage

A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil

Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping

Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section

The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat)

A type of limnic layer composed predominantly of fecal material derived from aquatic animals.

Corrosion (geomorphology)

A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations)

Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop

A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management

Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system

Growing crops according to a planned system of rotation and management practices.

Cross-slope farming

Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown

The upper part of a tree or shrub, including the living branches and their foliage.

Cryoturbate

A mass of soil or other unconsolidated earthy material moved or disturbed by frost action. It is typically coarser than the underlying material.

Cuesta

An asymmetric ridge capped by resistant rock layers of slight or moderate dip (commonly less than 15 percent slopes); a type of homocline produced by differential erosion of interbedded resistant and weak rocks. A cuesta has a long, gentle slope on one side (dip slope) that roughly parallels the inclined beds; on the other side, it has a relatively short and steep or clifflike slope (scarp) that cuts through the tilted rocks.

Culmination of the mean annual increment (CMAI)

The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave

The walls of excavations tend to cave in or slough.

Decreasers

The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing

Postponing grazing or resting grazing land for a prescribed period.

Delta

A body of alluvium having a surface that is fan shaped and nearly flat; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer

A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depression, closed (map symbol)

A shallow, saucer-shaped area that is slightly lower on the landscape than the surrounding area and that does not have a natural outlet for surface drainage.

Depth, soil

Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Desert pavement

A natural, residual concentration or layer of wind-polished, closely packed gravel, boulders, and other rock fragments mantling a desert surface. It forms where wind action and sheetwash have removed all smaller particles or where rock fragments have migrated upward through sediments to the surface. It typically protects the finer grained underlying material from further erosion.

Diatomaceous earth

A geologic deposit of fine, grayish siliceous material composed chiefly or entirely of the remains of diatoms.

Dip slope

A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace)

A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming

A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural)

Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface

Runoff, or surface flow of water, from an area.

Drainageway

A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Draw

A small stream valley that generally is shallower and more open than a ravine or gulch and that has a broader bottom. The present stream channel may appear inadequate to have cut the drainageway that it occupies.

Drift

A general term applied to all mineral material (clay, silt, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or transported by running water emanating from a glacier. Drift includes unstratified material (till) that forms moraines and stratified deposits that form outwash plains, eskers, kames, varves, and glaciofluvial sediments. The term is generally applied to Pleistocene glacial deposits in areas that no longer contain glaciers.

Drumlin

A low, smooth, elongated oval hill, mound, or ridge of compact till that has a core of bedrock or drift. It commonly has a blunt nose facing the direction from which the ice approached and a gentler slope tapering in the other direction. The longer axis is parallel to the general direction of glacier flow. Drumlins are products of streamline (laminar) flow of glaciers, which molded the subglacial floor through a combination of erosion and deposition.

Duff

A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune

A low mound, ridge, bank, or hill of loose, windblown granular material (generally sand), either barren and capable of movement from place to place or covered and stabilized with vegetation but retaining its characteristic shape.

Earthy fill

See Mine spoil.

Ecological site

An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eluviation

The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation

A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian deposit

Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.

Ephemeral stream

A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation

A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion

The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (accelerated)

Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion (geologic)

Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion pavement

A surficial lag concentration or layer of gravel and other rock fragments that remains on the soil surface after sheet or rill erosion or wind has removed the finer soil particles and that tends to protect the underlying soil from further erosion.

Erosion surface

A land surface shaped by the action of erosion, especially by running water.

Escarpment

A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Escarpment, bedrock (map symbol)

A relatively continuous and steep slope or cliff, produced by erosion or faulting, that breaks the general continuity of more gently sloping land surfaces. Exposed material is hard or soft bedrock.

Escarpment, nonbedrock (map symbol)

A relatively continuous and steep slope or cliff, generally produced by erosion but in some places produced by faulting, that breaks the continuity of more gently sloping land surfaces. Exposed earthy material is nonsoil or very shallow soil.

Esker

A long, narrow, sinuous, steep-sided ridge of stratified sand and gravel deposited as the bed of a stream flowing in an ice tunnel within or below the ice (subglacial) or between ice walls on top of the ice of a wasting glacier and left

behind as high ground when the ice melted. Eskers range in length from less than a kilometer to more than 160 kilometers and in height from 3 to 30 meters.

Extrusive rock

Igneous rock derived from deep-seated molten matter (magma) deposited and cooled on the earth's surface.

Fallow

Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan remnant

A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, that have been either dissected or partially buried.

Fertility, soil

The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat)

The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity

The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

Fill slope

A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil

Sandy clay, silty clay, or clay.

Firebreak

An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom

An obsolete, informal term loosely applied to the lowest flood-plain steps that are subject to regular flooding.

Flaggy soil material

Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone

A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain

The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

Flood-plain landforms

A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.

Flood-plain splay

A fan-shaped deposit or other outspread deposit formed where an overloaded stream breaks through a levee (natural or artificial) and deposits its material (commonly coarse grained) on the flood plain.

Flood-plain step

An essentially flat, terrace-like alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface still actively modified by fluvial scour and/or deposition. May occur individually or as a series of steps.

Fluvial

Of or pertaining to rivers or streams; produced by stream or river action.

Foothills

A region of steeply sloping hills that fringes a mountain range or high-plateau escarpment. The hills have relief of as much as 1,000 feet (300 meters).

Footslope

The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb

Any herbaceous plant not a grass or a sedge.

Forest cover

All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type

A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan

A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil

The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai

Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glaciofluvial deposits

Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur in the form of outwash plains, valley trains, deltas, kames, eskers, and kame terraces.

Glaciolacustrine deposits

Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are bedded or laminated.

Gleyed soil

Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping

Growing crops in strips that grade toward a protected waterway.

Grassed waterway

A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel

Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravel pit (map symbol)

An open excavation from which soil and underlying material have been removed and used, without crushing, as a source of sand or gravel.

Gravelly soil material

Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Gravelly spot (map symbol)

A spot where the surface layer has more than 35 percent, by volume, rock fragments that are mostly less than 3 inches in diameter in an area that has less than 15 percent rock fragments.

Green manure crop (agronomy)

A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water

Water filling all the unblocked pores of the material below the water table.

Gully (map symbol)

A small, steep-sided channel caused by erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage whereas a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock

Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to reclaim

Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Hardpan

A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head slope (geomorphology)

A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat)

Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops

Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill

A generic term for an elevated area of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.

Hillslope

A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of a hill.

Horizon, soil

A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon: An organic layer of fresh and decaying plant residue.

L horizon: A layer of organic and mineral limnic materials, including coprogenous earth (sedimentary peat), diatomaceous earth, and marl.

A horizon: The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon: The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon: The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon: The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon: Soft, consolidated bedrock beneath the soil.

R layer: Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

M layer: A root-limiting subsoil layer consisting of nearly continuous, horizontally oriented, human-manufactured materials.

W layer: A layer of water within or beneath the soil.

Humus

The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups

Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties include depth to a seasonal high water table, the infiltration rate, and depth to a layer that significantly restricts the downward movement of water. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock

Rock that was formed by cooling and solidification of magma and that has not been changed appreciably by weathering since its formation. Major varieties include plutonic and volcanic rock (e.g., andesite, basalt, and granite).

Illuviation

The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil

A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers

Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration

The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity

The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate

The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate

The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Very low: Less than 0.2

Low: 0.2 to 0.4

Moderately low: 0.4 to 0.75

Moderate: 0.75 to 1.25

Moderately high: 1.25 to 1.75

High: 1.75 to 2.5

Very high: More than 2.5

Interfluve

A landform composed of the relatively undissected upland or ridge between two adjacent valleys containing streams flowing in the same general direction. An elevated area between two drainageways that sheds water to those drainageways.

Interfluve (geomorphology)

A geomorphic component of hills consisting of the uppermost, comparatively level or gently sloping area of a hill; shoulders of backwearing hillslopes can narrow the upland or can merge, resulting in a strongly convex shape.

Intermittent stream

A stream, or reach of a stream, that does not flow year-round but that is commonly dry for 3 or more months out of 12 and whose channel is generally below the local water table. It flows only during wet periods or when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders

On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions

See Redoximorphic features.

Irrigation

Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin: Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border: Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding: Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation: Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle): Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow: Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler: Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation: Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding: Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame

A low mound, knob, hummock, or short irregular ridge composed of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier; by a supraglacial stream in a low place or hole on the surface of the glacier; or as a ponded deposit on the surface or at the margin of stagnant ice.

Karst (topography)

A kind of topography that formed in limestone, gypsum, or other soluble rocks by dissolution and that is characterized by closed depressions, sinkholes, caves, and underground drainage.

Knoll

A small, low, rounded hill rising above adjacent landforms.

Ksat

See Saturated hydraulic conductivity.

Lacustrine deposit

Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain

A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace

A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Landfill (map symbol)

An area of accumulated waste products of human habitation, either above or below natural ground level.

Landslide

A general, encompassing term for most types of mass movement landforms and processes involving the downslope transport and outward deposition of soil and rock materials caused by gravitational forces; the movement may or may not involve saturated materials. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones

Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lava flow (map symbol)

A solidified, commonly lobate body of rock formed through lateral, surface outpouring of molten lava from a vent or fissure.

Leaching

The removal of soluble material from soil or other material by percolating water.

Levee (map symbol)

An embankment that confines or controls water, especially one built along the banks of a river to prevent overflow onto lowlands.

Linear extensibility

Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. 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. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit

The moisture content at which the soil passes from a plastic to a liquid state.

Loam

Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess

Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Low strength

The soil is not strong enough to support loads.

Low-residue crops

Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Marl

An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal proportions; formed primarily under freshwater lacustrine conditions but also formed in more saline environments.

Marsh or swamp (map symbol)

A water-saturated, very poorly drained area that is intermittently or permanently covered by water. Sedges, cattails, and rushes are the dominant vegetation in marshes, and trees or shrubs are the dominant vegetation in swamps. Not used in map units where the named soils are poorly drained or very poorly drained.

Mass movement

A generic term for the dislodgment and downslope transport of soil and rock material as a unit under direct gravitational stress.

Masses

See Redoximorphic features.

Meander belt

The zone within which migration of a meandering channel occurs; the flood-plain area included between two imaginary lines drawn tangential to the outer bends of active channel loops.

Meander scar

A crescent-shaped, concave or linear mark on the face of a bluff or valley wall, produced by the lateral erosion of a meandering stream that impinged upon and undercut the bluff.

Meander scroll

One of a series of long, parallel, close-fitting, crescent-shaped ridges and troughs formed along the inner bank of a stream meander as the channel migrated laterally down-valley and toward the outer bank.

Mechanical treatment

Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil

Very fine sandy loam, loam, silt loam, or silt.

Mesa

A broad, nearly flat topped and commonly isolated landmass bounded by steep slopes or precipitous cliffs and capped by layers of resistant, nearly horizontal rocky material. The summit width is characteristically greater than the height of the bounding escarpments.

Metamorphic rock

Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement at depth in the earth's crust. Nearly all such rocks are crystalline.

Mine or quarry (map symbol)

An open excavation from which soil and underlying material have been removed and in which bedrock is exposed. Also denotes surface openings to underground mines.

Mine spoil

An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation. Also called earthy fill.

Mineral soil

Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage

Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area

A kind of map unit that has little or no natural soil and supports little or no vegetation.

Miscellaneous water (map symbol)

Small, constructed bodies of water that are used for industrial, sanitary, or mining applications and that contain water most of the year.

Moderately coarse textured soil

Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil

Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon

A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine

In terms of glacial geology, a mound, ridge, or other topographically distinct accumulation of unsorted, unstratified drift, predominantly till, deposited primarily by the direct action of glacial ice in a variety of landforms. Also, a general term for a landform composed mainly of till (except for kame moraines, which are composed mainly of stratified outwash) that has been deposited by a glacier. Some types of moraines are disintegration, end, ground, kame, lateral, recessional, and terminal.

Morphology, soil

The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil

Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mountain

A generic term for an elevated area of the land surface, rising more than 1,000 feet (300 meters) above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can

occur as a single, isolated mass or in a group forming a chain or range. Mountains are formed primarily by tectonic activity and/or volcanic action but can also be formed by differential erosion.

Muck

Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mucky peat

See Hemic soil material.

Mudstone

A blocky or massive, fine grained sedimentary rock in which the proportions of clay and silt are approximately equal. Also, a general term for such material as clay, silt, claystone, siltstone, shale, and argillite and that should be used only when the amounts of clay and silt are not known or cannot be precisely identified.

Munsell notation

A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon

A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil

A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules

See Redoximorphic features.

Nose slope (geomorphology)

A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

Nutrient, plant

Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter

Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Custom Soil Resource Report

Very low: Less than 0.5 percent

Low: 0.5 to 1.0 percent

Moderately low: 1.0 to 2.0 percent

Moderate: 2.0 to 4.0 percent

High: 4.0 to 8.0 percent

Very high: More than 8.0 percent

Outwash

Stratified and sorted sediments (chiefly sand and gravel) removed or “washed out” from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of a glacier. The coarser material is deposited nearer to the ice.

Outwash plain

An extensive lowland area of coarse textured glaciofluvial material. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace

An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan

A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

Parent material

The unconsolidated organic and mineral material in which soil forms.

Peat

Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped

An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment

A layer of sediment, eroded from the shoulder and backslope of an erosional slope, that lies on and is being (or was) transported across a gently sloping erosional surface at the foot of a receding hill or mountain slope.

Pedon

The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation

The movement of water through the soil.

Perennial water (map symbol)

Small, natural or constructed lakes, ponds, or pits that contain water most of the year.

Permafrost

Ground, soil, or rock that remains at or below 0 degrees C for at least 2 years. It is defined on the basis of temperature and is not necessarily frozen.

pH value

A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil

A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Piping

Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting

Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plastic limit

The moisture content at which a soil changes from semisolid to plastic.

Plasticity index

The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plateau (geomorphology)

A comparatively flat area of great extent and elevation; specifically, an extensive land region that is considerably elevated (more than 100 meters) above the adjacent lower lying terrain, is commonly limited on at least one side by an abrupt descent, and has a flat or nearly level surface. A comparatively large part of a plateau surface is near summit level.

Playa

The generally dry and nearly level lake plain that occupies the lowest parts of closed depressions, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff. Playa deposits are fine grained and may or may not have a high water table and saline conditions.

Plinthite

The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan

A compacted layer formed in the soil directly below the plowed layer.

Ponding

Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded

Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Pore linings

See Redoximorphic features.

Potential native plant community

See Climax plant community.

Potential rooting depth (effective rooting depth)

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning

Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil

The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil

A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use

Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and

promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland

Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil

A measure of acidity or alkalinity of a soil, expressed as pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid: Less than 3.5

Extremely acid: 3.5 to 4.4

Very strongly acid: 4.5 to 5.0

Strongly acid: 5.1 to 5.5

Moderately acid: 5.6 to 6.0

Slightly acid: 6.1 to 6.5

Neutral: 6.6 to 7.3

Slightly alkaline: 7.4 to 7.8

Moderately alkaline: 7.9 to 8.4

Strongly alkaline: 8.5 to 9.0

Very strongly alkaline: 9.1 and higher

Red beds

Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations

See Redoximorphic features.

Redoximorphic depletions

See Redoximorphic features.

Redoximorphic features

Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:
 - A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*
 - B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*
 - C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.
2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:
 - A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*
 - B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletans).
3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix

See Redoximorphic features.

Regolith

All unconsolidated earth materials above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits.

Relief

The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material)

Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Rill

A very small, steep-sided channel resulting from erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. A rill generally is not an obstacle to wheeled vehicles and is shallow enough to be smoothed over by ordinary tillage.

Riser

The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

Road cut

A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments

Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop (map symbol)

An exposure of bedrock at the surface of the earth. Not used where the named soils of the surrounding map unit are shallow over bedrock or where "Rock outcrop" is a named component of the map unit.

Root zone

The part of the soil that can be penetrated by plant roots.

Runoff

The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil

A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Saline spot (map symbol)

An area where the surface layer has an electrical conductivity of 8 mmhos/cm more than the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has an electrical conductivity of 2 mmhos/cm or less.

Sand

As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone

Sedimentary rock containing dominantly sand-sized particles.

Sandy spot (map symbol)

A spot where the surface layer is loamy fine sand or coarser in areas where the surface layer of the named soils in the surrounding map unit is very fine sandy loam or finer.

Sapric soil material (muck)

The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturated hydraulic conductivity (Ksat)

The ease with which pores of a saturated soil transmit water. Formally, the proportionality coefficient that expresses the relationship of the rate of water movement to hydraulic gradient in Darcy's Law, a law that describes the rate of water movement through porous media. Commonly abbreviated as "Ksat." Terms describing saturated hydraulic conductivity are:

Very high: 100 or more micrometers per second (14.17 or more inches per hour)

High: 10 to 100 micrometers per second (1.417 to 14.17 inches per hour)

Moderately high: 1 to 10 micrometers per second (0.1417 inch to 1.417 inches per hour)

Moderately low: 0.1 to 1 micrometer per second (0.01417 to 0.1417 inch per hour)

Low: 0.01 to 0.1 micrometer per second (0.001417 to 0.01417 inch per hour)

Very low: Less than 0.01 micrometer per second (less than 0.001417 inch per hour).

To convert inches per hour to micrometers per second, multiply inches per hour by 7.0572. To convert micrometers per second to inches per hour, multiply micrometers per second by 0.1417.

Saturation

Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification

The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Sedimentary rock

A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

Sequum

A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil

A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Severely eroded spot (map symbol)

An area where, on the average, 75 percent or more of the original surface layer has been lost because of accelerated erosion. Not used in map units in which "severely eroded," "very severely eroded," or "gullied" is part of the map unit name.

Shale

Sedimentary rock that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion

The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Short, steep slope (map symbol)

A narrow area of soil having slopes that are at least two slope classes steeper than the slope class of the surrounding map unit.

Shoulder

The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.

Shrink-swell

The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Shrub-coppice dune

A small, streamlined dune that forms around brush and clump vegetation.

Side slope (geomorphology)

A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

Silica

A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio

The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt

As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone

An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.

Similar soils

Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole (map symbol)

A closed, circular or elliptical depression, commonly funnel shaped, characterized by subsurface drainage and formed either by dissolution of the surface of underlying bedrock (e.g., limestone, gypsum, or salt) or by collapse of underlying caves within bedrock. Complexes of sinkholes in carbonate-rock terrain are the main components of karst topography.

Site index

A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides (pedogenic)

Grooved, striated, and/or glossy (shiny) slip faces on structural peds, such as wedges; produced by shrink-swell processes, most commonly in soils that have a high content of expansive clays.

Slide or slip (map symbol)

A prominent landform scar or ridge caused by fairly recent mass movement or descent of earthy material resulting from failure of earth or rock under shear stress along one or several surfaces.

Slope

The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope alluvium

Sediment gradually transported down the slopes of mountains or hills primarily by nonchannel alluvial processes (i.e., slope-wash processes) and characterized by particle sorting. Lateral particle sorting is evident on long slopes. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. Burnished peds and sorting of rounded or subrounded pebbles or cobbles distinguish these materials from unsorted colluvial deposits.

Slow refill

The slow filling of ponds, resulting from restricted water transmission in the soil.

Slow water movement

Restricted downward movement of water through the soil. See Saturated hydraulic conductivity.

Sodic (alkali) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodic spot (map symbol)

An area where the surface layer has a sodium adsorption ratio that is at least 10 more than that of the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has a sodium adsorption ratio of 5 or less.

Sodicity

The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $\text{Ca}^{++} + \text{Mg}^{++}$. The degrees of sodicity and their respective ratios are:

Slight: Less than 13:1

Moderate: 13-30:1

Strong: More than 30:1

Sodium adsorption ratio (SAR)

A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock

Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil

A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates

Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand: 2.0 to 1.0

Coarse sand: 1.0 to 0.5

Medium sand: 0.5 to 0.25

Fine sand: 0.25 to 0.10

Very fine sand: 0.10 to 0.05

Silt: 0.05 to 0.002

Clay: Less than 0.002

Solum

The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Spoil area (map symbol)

A pile of earthy materials, either smoothed or uneven, resulting from human activity.

Stone line

In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial. Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

Stones

Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony

Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stony spot (map symbol)

A spot where 0.01 to 0.1 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surrounding soil has no surface stones.

Strath terrace

A type of stream terrace; formed as an erosional surface cut on bedrock and thinly mantled with stream deposits (alluvium).

Stream terrace

One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

Stripcropping

Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil

The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are:

Platy: Flat and laminated

Prismatic: Vertically elongated and having flat tops

Columnar: Vertically elongated and having rounded tops

Angular blocky: Having faces that intersect at sharp angles (planes)

Subangular blocky: Having subrounded and planar faces (no sharp angles)

Granular: Small structural units with curved or very irregular faces

Structureless soil horizons are defined as follows:

Single grained: Entirely noncoherent (each grain by itself), as in loose sand

Massive: Occurring as a coherent mass

Stubble mulch

Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil

Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling

Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum

The part of the soil below the solum.

Subsurface layer

Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow

The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit

The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer

The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil

The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus

Rock fragments of any size or shape (commonly coarse and angular) derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts

Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine

An end moraine that marks the farthest advance of a glacier. It typically has the form of a massive arcuate or concentric ridge, or complex of ridges, and is underlain by till and other types of drift.

Terrace (conservation)

An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field

generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geomorphology)

A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Terracettes

Small, irregular steplike forms on steep hillslopes, especially in pasture, formed by creep or erosion of surficial materials that may be induced or enhanced by trampling of livestock, such as sheep or cattle.

Texture, soil

The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer

Otherwise suitable soil material that is too thin for the specified use.

Till

Dominantly unsorted and nonstratified drift, generally unconsolidated and deposited directly by a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders; rock fragments of various lithologies are embedded within a finer matrix that can range from clay to sandy loam.

Till plain

An extensive area of level to gently undulating soils underlain predominantly by till and bounded at the distal end by subordinate recessional or end moraines.

Tilth, soil

The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope

The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil

The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements

Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread

The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Tuff

A generic term for any consolidated or cemented deposit that is 50 percent or more volcanic ash.

Upland

An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Valley fill

The unconsolidated sediment deposited by any agent (water, wind, ice, or mass wasting) so as to fill or partly fill a valley.

Variegation

Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve

A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very stony spot (map symbol)

A spot where 0.1 to 3.0 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surface of the surrounding soil is covered by less than 0.01 percent stones.

Water bars

Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering

All physical disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered material.

Well graded

Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wet spot (map symbol)

A somewhat poorly drained to very poorly drained area that is at least two drainage classes wetter than the named soils in the surrounding map unit.

Wilting point (or permanent wilting point)

The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow

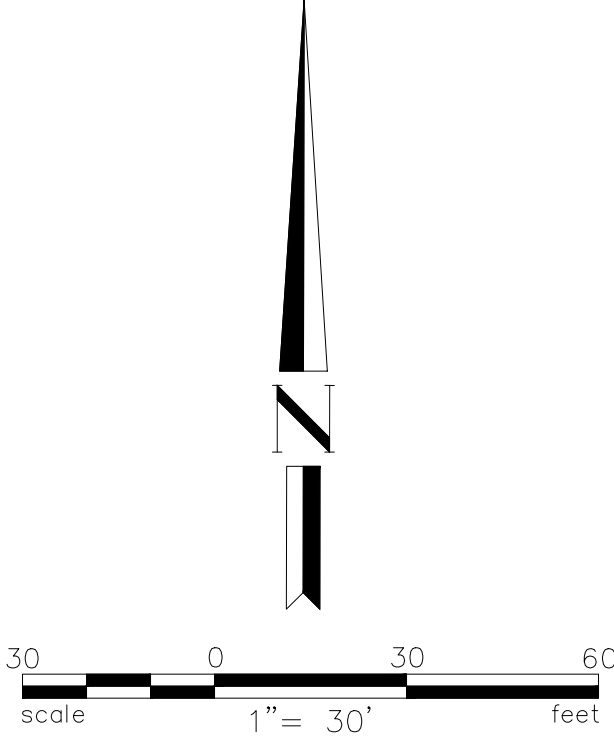
The uprooting and tipping over of trees by the wind.

MAP POCKET: EXISTING CONDITIONS EXHIBITS

- Existing Condition Hydrology Exhibit

INDEX

- FLOW PATH
- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION
- NODE ID AND ELEVATION
- DRAINAGE ACREAGE
- DRAINAGE AREA ID



DRAWN: DSB	DATE: 10/29/23
REVIEWED: DSB	DSB PROJECT NO: DSB25-014 Glen Ary, E Benton
SCALE: 1"=20'	PROJECT NAME: COMMERCIAL AGRICULTURE FACILITY
REVIEWING AGENCY: COUNTY OF RIVERSIDE	

HYDROLOGY EXHIBIT - EXISTING CONDITION
COMMERCIAL AGRICULTURE FACILITY
COUNTY OF RIVERSIDE

ENGINEER OF WORK

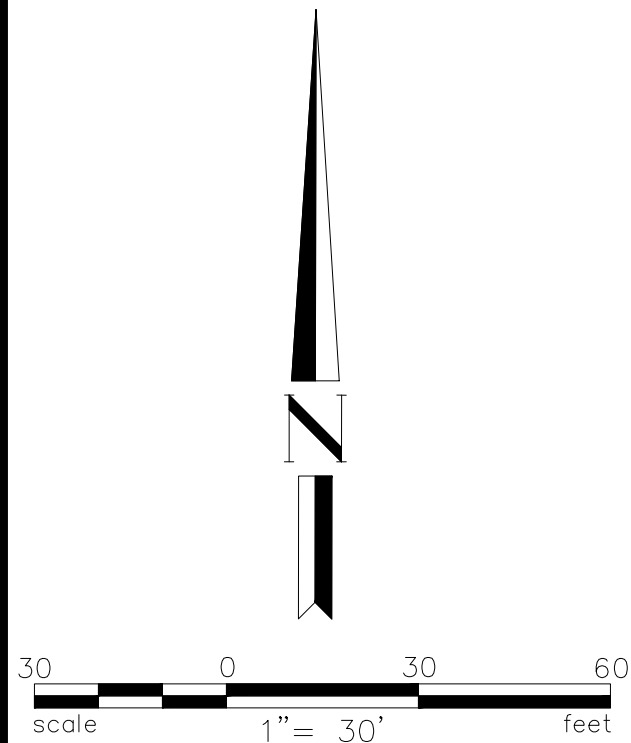
DSB ENGINEERING
43460 RIDGE PARK DRIVE, SUITE 200T
TEMECULA, CA 92590
951.440.5703
DINO@DSBENG.COM

MAP POCKET: PROPOSED CONDITIONS EXHIBITS

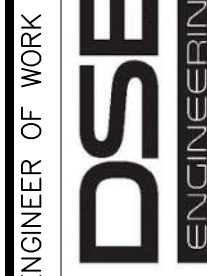
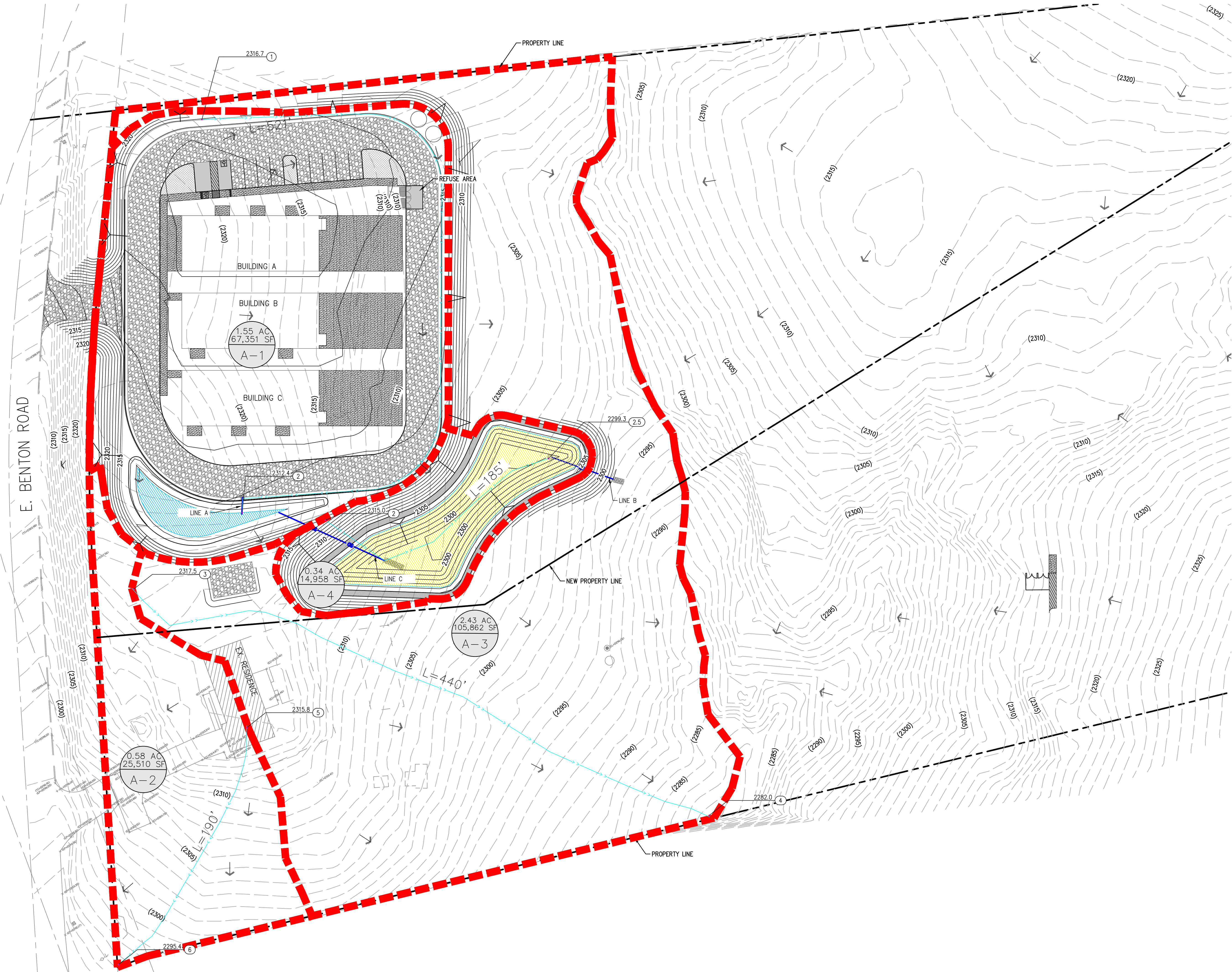
- Proposed Condition Hydrology Exhibit

INDEX

- FLOW PATH
- DRAINAGE AREA BOUNDARY
- FLOW DIRECTION
- NODE ID AND ELEVATION
- 0.40 AC
5,000 SF
D DRAINAGE ACREAGE
DRAINAGE AREA ID
- PROPOSED DG
- PROPOSED BIORETENTION
- PROPOSED DETENTION BASIN



E. BENTON ROAD



ENGINEER OF WORK
DSB ENGINEERING
43460 RIDGE PARK DRIVE, SUITE 200T
TEMECULA, CA 92590
951.440.5703
DINO@DSBENG.COM

HYDROLOGY EXHIBIT - PROPOSED CONDITION
COMMERCIAL AGRICULTURE FACILITY
COUNTY OF RIVERSIDE

DRAWN: DSB
REVIEWED: DSB
SCALE: 1"=20'
REVIEWING AGENCY: COUNTY OF RIVERSIDE

DATE: 10/29/23

DSB PROJECT NO: DSB25-014 Glen Aery, E Benton

PROJECT NAME: COMMERCIAL AGRICULTURE FACILITY

FILE PATH: D:\DSB Engineering Services\Project\DSB25-014 Glen Aery, E Benton\Reports\Drainage (CAD)
FILE NAME: Commercial AG Drainage Exhibits