

Drainage Report

for

Boulders Meniffee Mixed Use Development

APN # 339-200-080-5

October 22, 2020

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1 INTRODUCTION

1.1. SITE DESCRIPTION

1.1.1. LOCATION

The site is located East of Berea Road and North of Normandy Road in the City of Menifee. The site does not have an address. The APN is 339-200-080-5.

1.1.2. EXISTING CONDITION

The existing site is approximately 9.48 acres of undeveloped vacant land with natural vegetation. The existing drainage pattern is from the Southeast corner to the Northwest corner of the site. A portion also drains to the south west corner of the site. No groundwater was found during geotechnical investigations. The site has type A, B, C, and D soils with a moderately high infiltration rate of 2.2 to 7.0 in/hr to transmit water (Ksat) per the Geotechnical Report. The site includes various sandy loam soils and soil type C has been used for the hydrology calculations.

1.1.3. PROPOSED CONDITION

The proposed project is a mixed use development, which includes multi-family residential, a daycare, office building, and a club house. Two driveways are proposed on Berea Road to give access to the site and one driveway on Normandy Road. The proposed drainage discharges from the site in the northeast corner following the pattern of the existing condition. Onsite flows will not drain to the culvert in Berea Road. All onsite is directed to the northern channel and peak flows are mitigated to be less than the existing flows to the channel.

1.2. PURPOSE OF REPORT

The purpose of this report is for the analysis of the hydrological and hydraulic conditions of the subject parcel during modeled flood events and the design recommendations to mitigate increased runoff and provide water quality treatment in accordance with the City of Menifee and Riverside County Flood Control, and California standards and guidelines.

1.3. FLOOD INFORMATION

The project is located in the Santa Ana Watershed. FEMA area flood map 06065C2055H delineates the site as zone X which states the site is located just outside the area of 0.2% annual chance of flood; and not within any areas of 1% annual chance of flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and not within areas protected by levees from 1% annual chance flood. The map is attached in the Appendices.

2. SITE DISCUSSION

2.1. SITE

A Riverside County Flood Control channel exists to the north of the site and a culvert under Berea Road drains the southern portion of the site. The drainage plan follows that of the Riverside County Hydrology Manual. The site is located in the Santa Ana Watershed. A geotechnical study was completed for the site. The site is undisturbed and has a slope of about 2.5% across the site.

3. RAINFALL DATA

3.1. Data

Rainfall data was pulled from the NOAA site and also from the Riverside County Hydrology Manual. See the appendix for the report from NOAA and the intensity tables from the county hydrology manual.

4. ONSITE RUNOFF

4.1. ONSITE

The site slopes to the north and west, draining northwesterly corner and southwesterly of the project site. The Rational Hydrology method was used to estimate peak flows, which would be used to size pipes, swales and gutters. Per the Runoff Curve Number on figure C-3 in the Hydrology Manual, a CN number of 79, which is grass for type C soils, was selected for the AMC II condition. The existing site has 0% impervious surface area. A CN number of 69, which is landscaping for type C soils, was selected for the AMC II condition. The proposed site has a 7.55 acres impervious surface area, which is 79.6% of the site. The existing and proposed rational hydrology maps are provided in the appendix. The following tables summarize the information and flows from the rational hydrology:

RATIONAL HYDROLOGY SUMMARY						
EXISTING CONDITION						
	Q10			Q100		
AREA	TC (MINS)	I	Q10 (CFS)	TC (MINS)	I	Q100 (CFS)
A1	16.4	1.73	8.67	16.4	2.59	13.67
B1	18.5	1.62	3.48	18.5	2.42	5.47
OA1	10	2.25	1.68	10	3.36	2.54
OB1	9.9	2.26	0.63	9.9	3.38	0.95
PROPOSED CONDITION						
	Q10			Q100		
AREA	TC (MINS)	I	Q10 (CFS)	TC (MINS)	I	Q100 (CFS)
A1	9.8	2.27	5.92	9.8	3.39	8.94
A2	5	3.25	1.32	5	4.85	2.02
CONFLUENCE	10.63		6.84	10.57		10.35
A3	9.5	2.31	2.19	9.5	3.45	3.23
CONFLUENCE	10.65		8.92	10.58		13.41
A4	9.7	2.27	3.53	9.7	3.41	5.31
A5	12.8	1.98	5.25	12.8	2.94	7.71
CONFLUENCE	12.8		8.34	12.8		12.29
CONFLUENCE	13.03		16.55	13.03		24.54
OA1	10	2.25	1.64	10	3.36	2.49
OB1	9.9	2.26	0.61	9.9	3.38	0.93

Peak flow is being mitigated by the detention/retention chamber system that is proposed along the west end of the site. The chamber will store runoff from the site and discharge mitigated flows through its outlet structure. Runoff from the site flows to pretreatment forebays throughout the site and once the volume reaches 6" depth, it flows into grated inlets to enter the storm drain system. Flows are then conveyed to the detention/retention chamber. The chamber includes an oil guard prior to the outlet structure. Also, an irrigation pump is included for harvest and reuse purposes. The outlet structure discharges to the Riverside County Flood Control channel to the north.

Unit Hydrographs were developed to calculate the volume difference between the pre-development and post-development conditions. The volume and peak flow increases are mitigated by the detention chamber. CivilD was used to run the unit hydrographs and to route them. The exhibits and calculations, including the stage-storage table, is included in the appendices. The following table summarizes the analysis for the 10 year and 100 year storms:

UNIT HYDROGRAPH AND FLOOD ROUTING SUMMARY						
STORM EVENT	DURATION	EXISTING PEAK FLOW (CFS)	EXISTING VOLUME (CF)	PROPOSED PEAK FLOW (CFS)	PROPOSED VOLUME (CF)	ROUTED PEAK FLOW (CFS)
10	3	11.51	39160	11.51	39645	7.7
	6	10.82	52955	9.55	50812	7.01
	24	3.54	61591	3.46	83057	3.27
100	3	19.29	74162	19.28	72439	13.1
	6	16.01	94300	15.92	90982	11.31
	24	6.57	149894	6.43	151510	6.14

All onsite storm drain conveyance systems shall be sized to conservatively accommodate all 100-year rational peak flowrates.

5. OFFSITE RUNOFF

5.1. OFFSITE

The offsite flows are diverted around the site. A new catch basin will be constructed on Berea, which will capture flows from Normandy as it did in the existing condition going to the culvert. Flows north of the culvert on Berea match the existing condition and flow to the North.

6. STORMWATER TREATMENT

6.1. BMPs and Mitigation

The site development includes pretreatment forebays throughout the site. All drainage on the site is routed to these forebays through surface flow. When flow reaches a depth of 6" in the forebays it will flow into the inlets and into the storm drain system, which flows to the detention chamber. Flows from the site are discharged to the channel North of the site as in the existing condition.

A WQMP has been developed and further details can be found in that report.

7. CONCLUSION

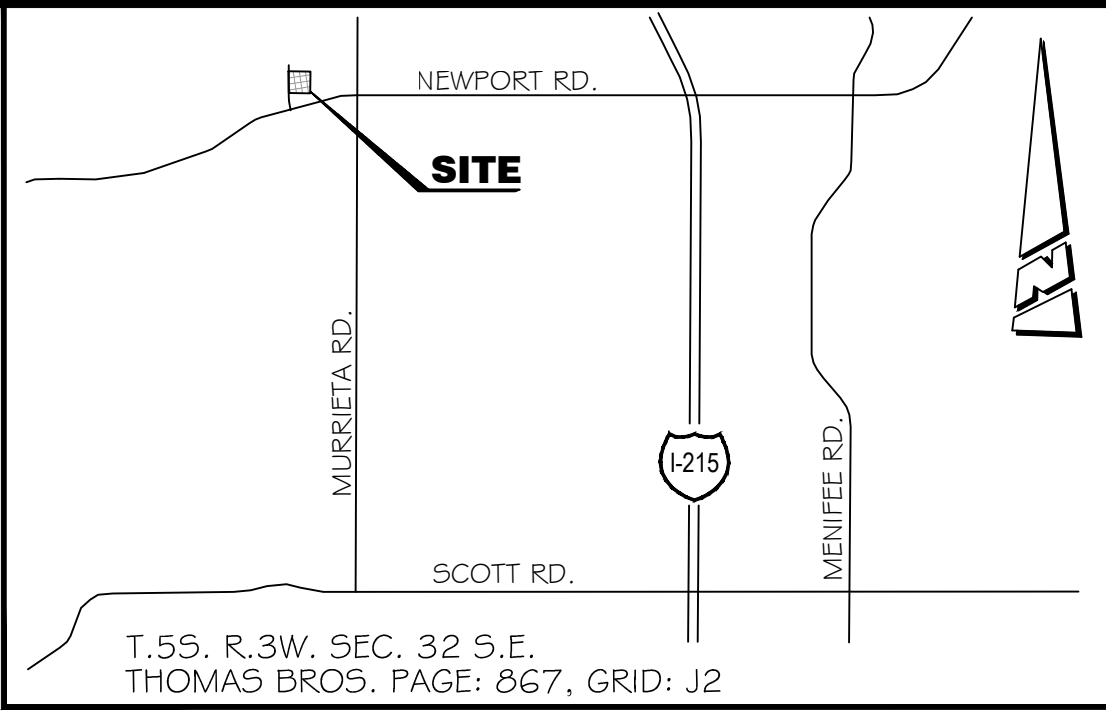
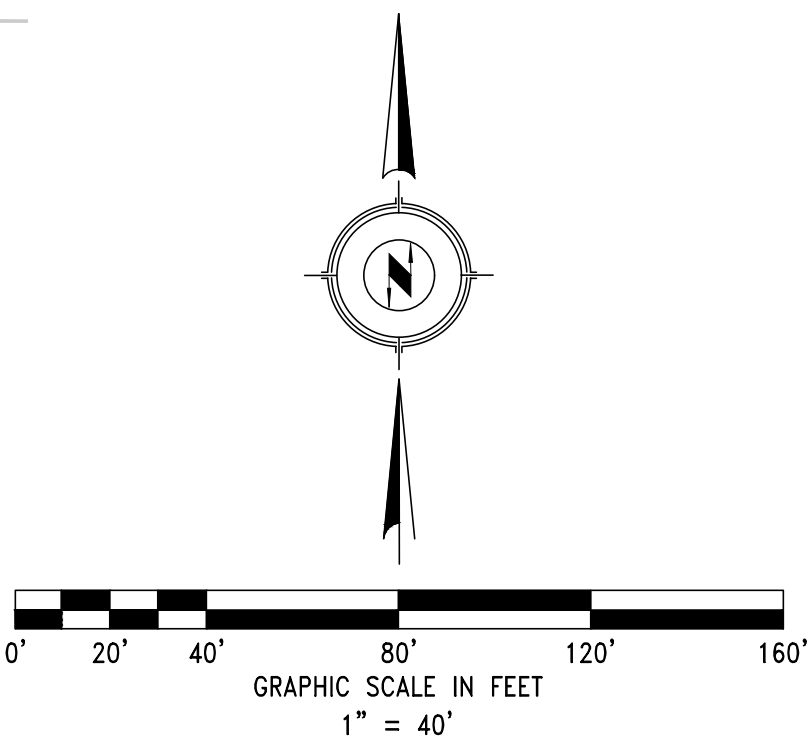
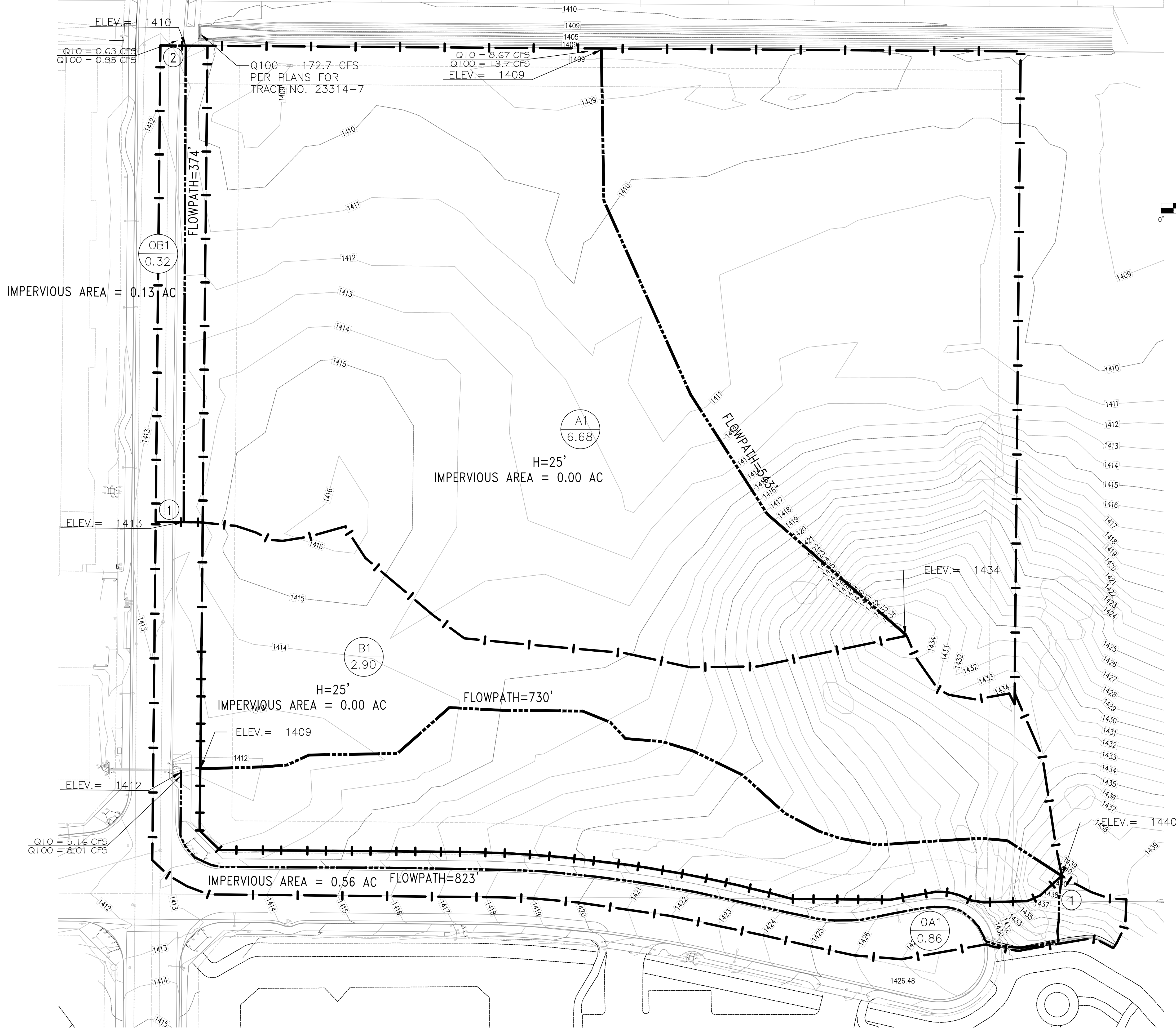
Rational Hydrology methodology was utilized to model the 10 and 100 year peak flows for this project. Unit hydrographs were developed using the CivilD program. The Riverside County Hydrology Manual was used to develop the hydrological parameters for the 10 and 100 year storm events. The difference in volume and peak flows shall be mitigated via the onsite detention chamber as explained in Section 4 and the Stormwater Treatment summary in Section 6. As displayed in the summary tables and calculations in the appendices, the peak flows are reduced below the existing flow to the northern channel. The peak flow from the rational table to the channel is 13.67 CFS and the maximum peak flow for the 100 year in the unit hydrograph analysis is 13.1 CFS.

Given the analysis, the proposed site meets the requirements of the City of Menifee and Riverside County Flood Control, and California standards and guidelines. The construction of the proposed site will not impact the hydrology in the area.

8. APPENDIX

Figure 1

EXISTING RATIONAL HYDROLOGY MAP
for BOULDER MIXED USE DEVELOPMENT



SITE ADDRESS:
NORTHEAST CORNER OF NORMANDY ROAD AND BEREA ROAD, MENIFEE, CA 92584

ASSESSOR'S PARCEL NO.:
339-200-080-5

FLOOD ZONE DESIGNATION:
THIS PROPERTY IS IN FLOODWAY AREA ZONE X, AS IS SHOWN ON FLOOD INSURANCE RATE MAPS FOR THE COUNTY OF RIVERSIDE, CALIFORNIA, SHOWN ON COMMUNITY PANEL NUMBER 06065C2055H.

ON-SITE DISTURBED AREA:
9.48 ACRES

EXISTING RATIONAL HYDROLOGY DATA		
AREA ID	10 YEAR Q	100 YEAR Q
A1	8.67 CFS	13.67 CFS
B1	3.48 CFS	5.47 CFS
OA1	1.68 CFS	2.54 CFS
OB1	0.63 CFS	0.95 CFS

LEGEND

- PROP. BLDG PERIMETER
- BOUNDARY LINE
- RIGHT OF WAY
- CENTERLINE
- FLOW LINE
- FENCE LINE
- DRAINAGE MANAGEMENT AREA
- EX. CONTOUR
- PROP. CONTOUR
- EX. PALM TREE
- EX. TREE
- EX. FIRE HYDRANT
- EX. BUILDING
- P.C.C. CONCRETE SURFACE
- SUBAREA BOUNDARY
- FLOWLINE
- BIORETENTION AREA
- REMOVE A.C. PAVEMENT
- RIPRAP
- TURF BLOCK POROUS PAVEMENT
- PROPOSED SLOPE EMBANKMENT
- LANDSCAPING
- A.C. PAVEMENT
- PAINT HANDICAP/CROSSWALK
- PAINT DIRECTION ARROW
- PAINT PARKING STALL
- INDICATES SUBAREA DESIGNATION
- INDICATES AREA IN ACRES
- INDICATES DIRECTION OF STORMWATER RUNOFF
- NODE POINTS



JOHN H. JOHNSON R.C.E. 83934 DATE
MY REGISTRATION EXPIRES ON 09/30/2021

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Figure 2

NEWPORT RD.

SITE

MURRIETA RD.

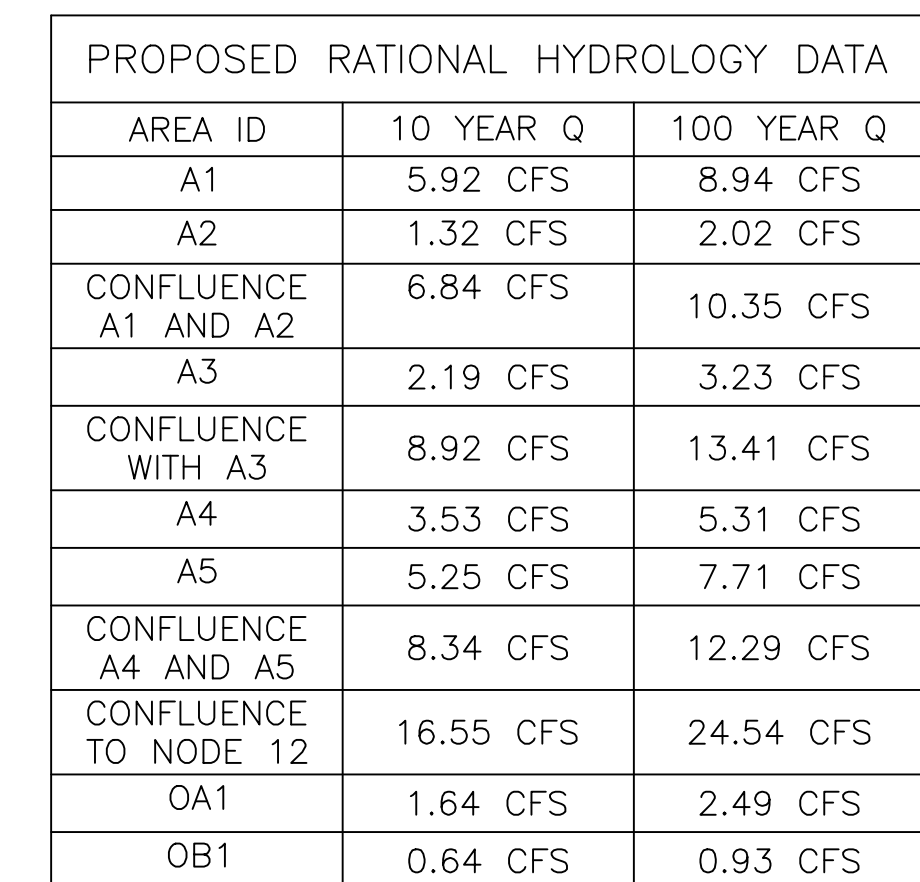
SCOTT RD.

1215

MENIFEE RD.

T.5S. R.3W. SEC. 32 S.E.
THOMAS BROS. PAGE: 067, GRID: J2

ON-SITE DISTURBED AREA:
9.48 ACRES



UNIT HYDROGRAPH AND FLOOD ROUTING SUMMARY						
STORM EVENT	DURATION	EXISTING PEAK FLOW (CFS)	EXISTING VOLUME (CF)	PROPOSED PEAK FLOW (CFS)	PROPOSED VOLUME (CF)	ROUTED PEAK FLOW (CFS)
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	6	16.01	94300	15.92	90982	11.31
	24	6.57	149894	6.43	151510	6.14

	PROP. BLDG PERIMETER		BIORETENTION AREA
	BOUNDARY LINE		REMOVE A.C. PAVEMENT
	RIGHT OF WAY		RIPRAP
	CENTERLINE		TURF BLOCK POROUS PAVEMENT
	FLOW LINE		PROPOSED SLOPE EMBANKMENT
	FENCE LINE		LANDSCAPING
	EX. CONTOUR		A.C. PAVEMENT
	PROP. CONTOUR		PAINT HANDICAP/CROSSWALK
	EX. PALM TREE		PAINT DIRECTION ARROW
	EX. TREE		PAINT PARKING STALL
	EX. FIRE HYDRANT		INDICATES SUBAREA DESIGNATION
	EX. BUILDING		INDICATES AREA IN ACRES
	P.C.C. CONCRETE SURFACE		INDICATES DIRECTION OF STORMWATER RUNOFF
	SUBAREA BOUNDARY		NODE POINTS
	FLOW INF.		

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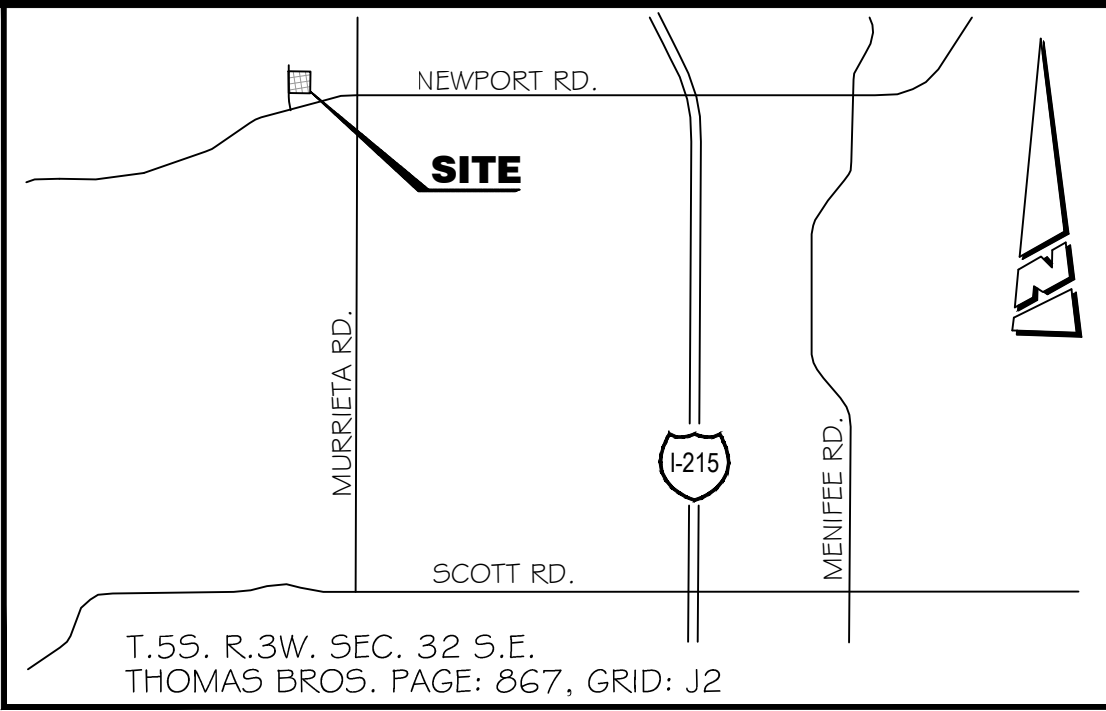
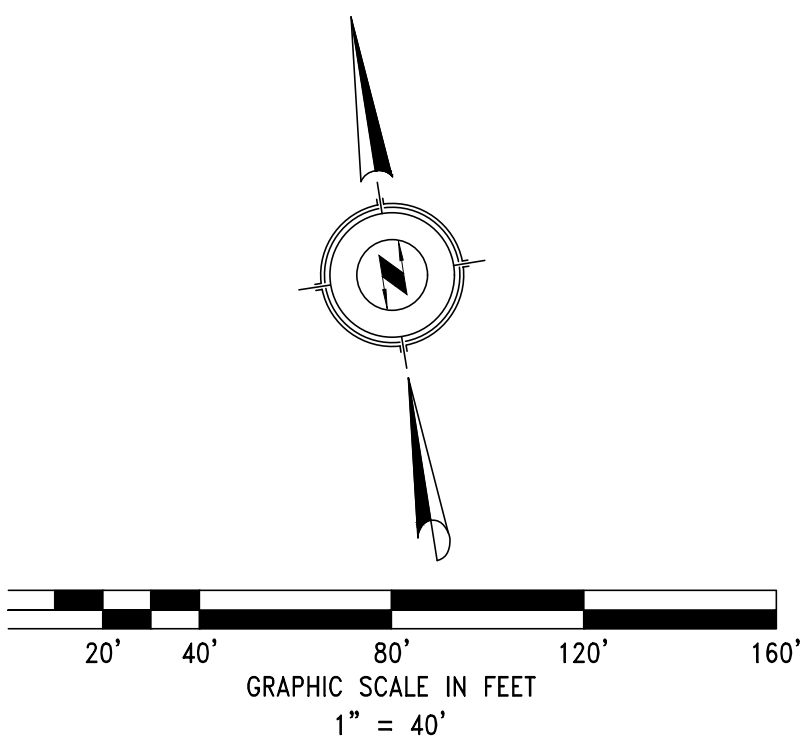
HEET
1
OF
1

Figure 3

EXISTING UNIT HYDROGRAPH MAP
for BOULDER MIXED USE DEVELOPMENT



EXISTING CONDITION



VICINITY MAP
NOT TO SCALE

SITE ADDRESS:
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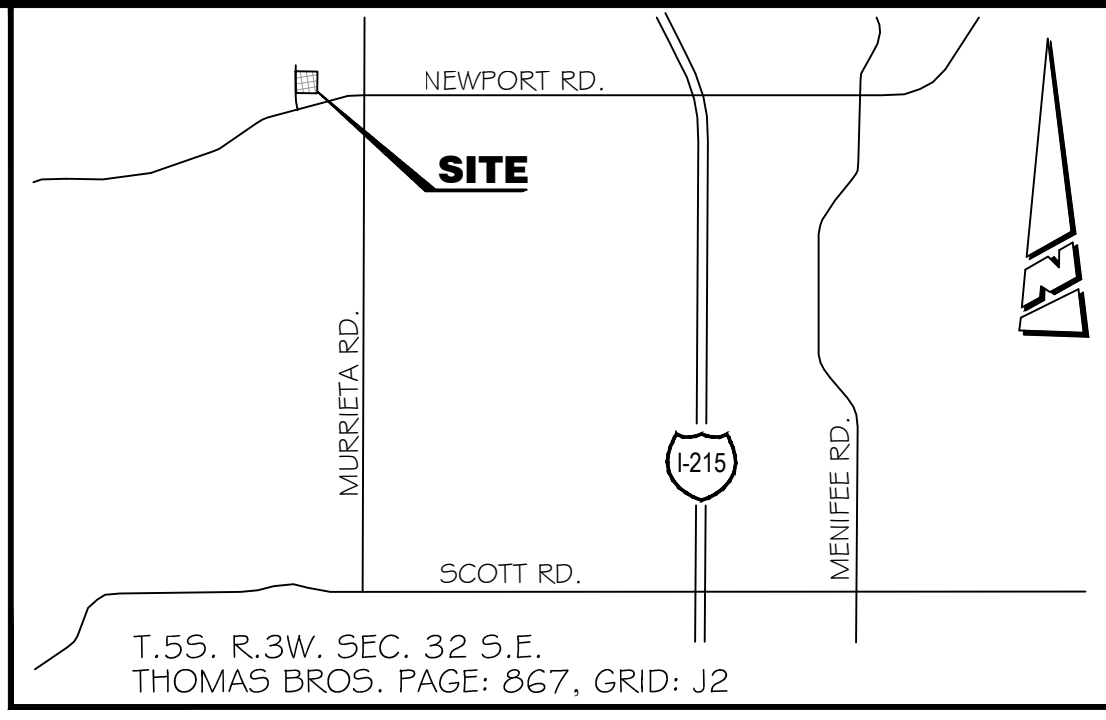
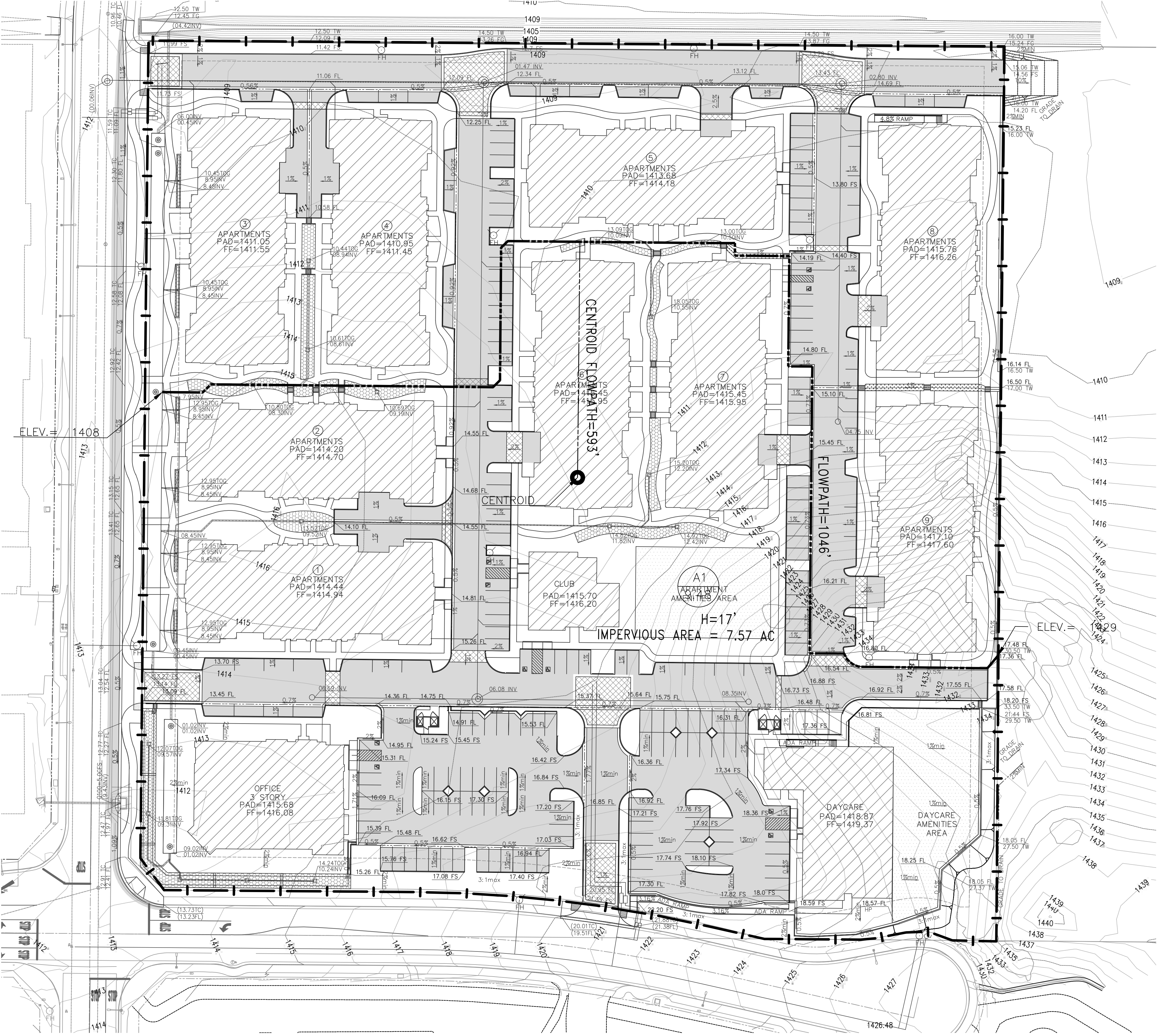


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Figure 4

PROPOSED UNIT HYDROGRAPH MAP
for BOULDER MIXED USE DEVELOPMENT



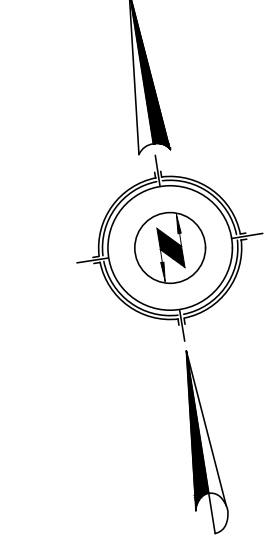
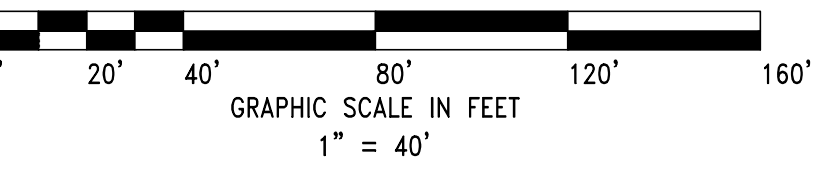
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PROPOSED CONDITION



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Figure 5

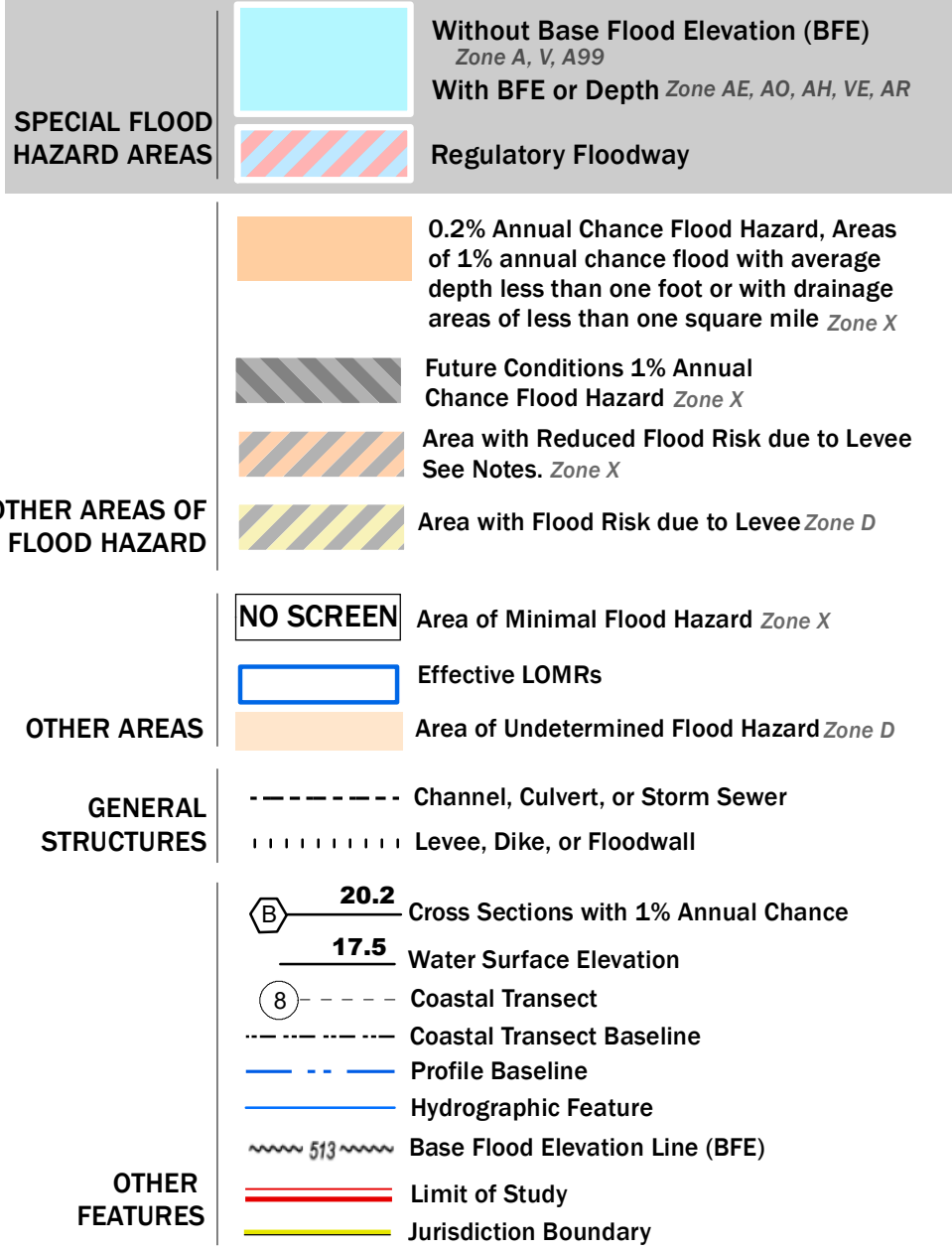


USGS The National Map: Orthoimagery, Data refreshed April, 2019.

33°39'15.86"N

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT



NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

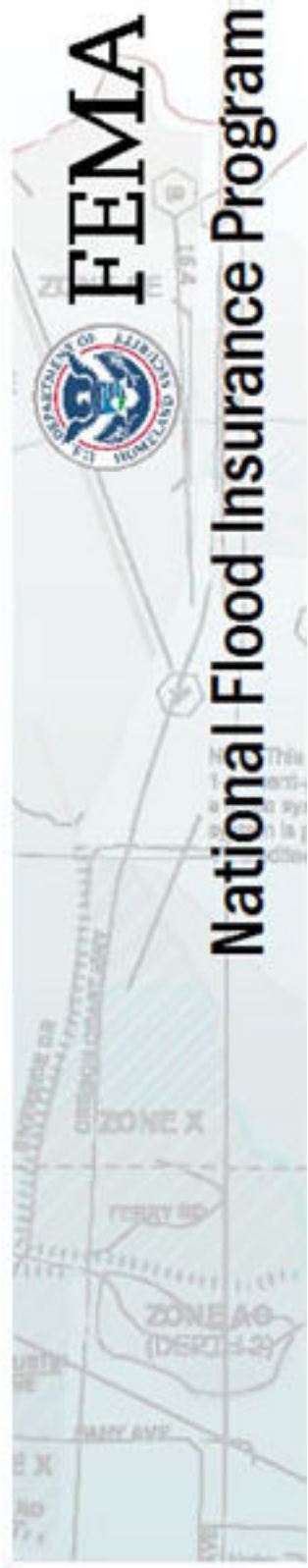
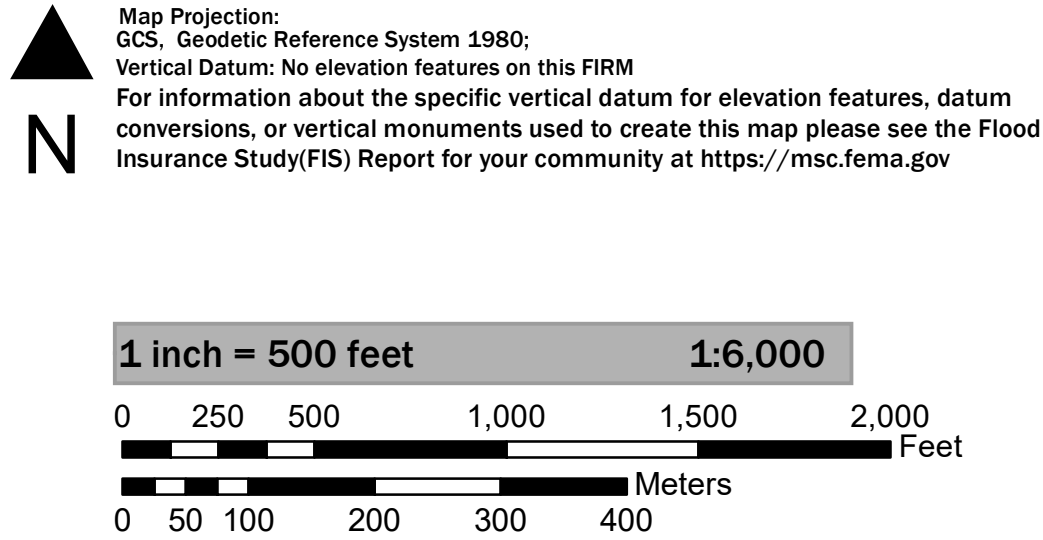
Basemap information shown on this FIRM was provided in digital format by USDA, Farm Service Agency (FSA). This information was derived from NAIP, dated April 11, 2018.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **1/10/2020 12:34:05 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at <https://www.fema.gov/media-library/assets/documents/118418>

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE



NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA
AND INCORPORATED AREAS
PANEL 2062 OF 3805

Panel Contains:		
COMMUNITY	NUMBER	PANEL
CITY OF LAKE EL SINORE CALIFORNIA	060636	2062
CITY OF MENIFEE CALIFORNIA	060176	2062

MAP NUMBER
06065C2062H
EFFECTIVE DATE
04/19/2017

National Flood Hazard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
OTHER FEATURES		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **1/10/2020 at 12:35:08 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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33°41'23.81"N



USGS The National Map: Orthoimagery, Data refreshed April, 2019.

0 250 500 1,000 1,500 2,000 Feet

1:6,000

33°40'53.88"N

117°12'29.32"W

Appendix A

RATIONAL CALCULATIONS

EXISTING RATIONAL HYDROLOGY - 10 YEAR											
Drainage Area	Soil and Development	A Acres	I in/hr	C	Q CFS	Sum Q CFS	Slope	V FPS	L FT	T MIN.	Sum T
A1							0.046		543.00	16.40	
	C Grass	6.68	1.73	0.75	8.67						16.40
						8.67					
B1`							0.042		730.00	18.50	
	C Grass	2.90	1.62	0.74	3.48						18.50
						3.48					
OA1							0.034		823.00	10.00	
	C Grass, Concrete	0.86	2.25	0.87	1.68						10.00
						1.68					
OB1							0.008		374.00	9.90	
	C Grass, Concrete	0.32	2.26	0.87	0.63						9.90
						0.63					

EXISTING RATIONAL HYDROLOGY - 100 YEAR											
Drainage Area	Soil and Development	A Acres	I in/hr	C	Q CFS	Sum Q CFS	Slope	V FPS	L FT	T MIN.	Sum T
A1							0.046		543.00	16.40	
	C Grass	6.68	2.59	0.79	13.67						16.40
						13.67					
B1`							0.042		730.00	18.50	
	C Grass	2.90	2.42	0.78	5.47						18.50
						5.47					
OA1							0.034		823.00	10.00	
	C Grass, Concrete	0.86	3.36	0.88	2.54						10.00
						2.54					
OB1							0.008		374.00	9.90	
	C Grass, Concrete	0.32	3.38	0.88	0.95						9.90
						0.95					

PROPOSED RATIONAL HYDROLOGY - 10 YEAR

Drainage Area	Soil and Development	A Acres	I in/hr	C	Q CFS	Sum Q CFS	Slope	V FPS	L FT	T MIN.	Sum T
A1							0.033		859.00	9.80	
	Commercial	3.03	2.27	0.86	5.92						9.80
						5.92					
PIPEFLOW											
A2							0.080	INITIAL	75.00	5.00	
	Commercial	0.49	3.25	0.83	1.32						5.00
CONFLUENCE A1 AND A2											
PIPEFLOW											
A3							0.015	INITIAL	517.00	9.50	
	Commercial	1.09	2.31	0.87	2.19						9.50
CONFLUENCE WITH A3											
PIPEFLOW											
A4							0.009	INITIAL	540.00	9.70	
	Commercial	1.81	2.27	0.86	3.53						9.70
						3.53					
PIPEFLOW											
A5							0.009	INITIAL	959.00	12.80	
	Commercial	3.05	1.98	0.87	5.25						12.80
CONFLUENCE A4 AND A5											
PIPEFLOW											
CONFLUENCE PIPEFLOW											
PIPEFLOW											
OA1							0.034		823.00	10.00	
	C Grass, Concrete	0.86	2.25	0.85	1.64						10.00
						1.64					
OB1							0.008		374.00	9.90	
	C Grass, Concrete	0.32	2.26	0.85	0.61						9.90
						0.61					

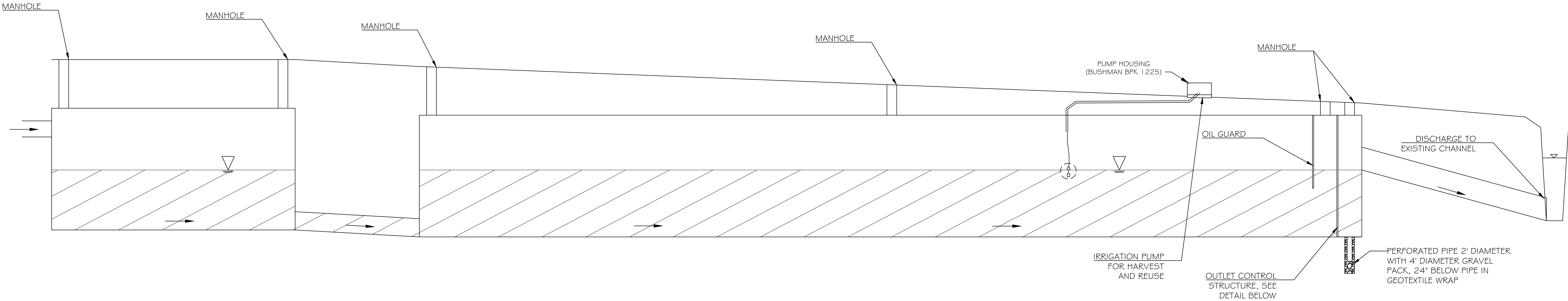
PROPOSED RATIONAL HYDROLOGY - 100 YEAR											
Drainage Area	Soil and Development	A Acres	I in/hr	C	Q CFS	Sum Q CFS	Slope	V FPS	L FT	T MIN.	Sum T
A1							0.033		859.00	9.80	
	Commercial	3.03	3.39	0.87	8.94						9.80
						8.94					
PIPEFLOW							0.009	7.4	340.00	0.77	10.57
A2							0.080	INITIAL	75.00	5.00	
	Commercial	0.49	4.85	0.85	2.02						5.00
CONFLUENCE A1 AND A2						10.35					10.57
PIPEFLOW							0.060	15	17.00	0.02	10.58
A3							0.015	INITIAL	517.00	9.50	
	Commercial	1.09	3.45	0.86	3.23						9.50
CONFLUENCE WITH A3						13.41					10.58
PIPEFLOW							0.010	7.8	104.00	0.22	10.81
A4							0.009	INITIAL	540.00	9.70	
	Commercial	1.81	3.41	0.86	5.31						9.70
						5.31					
PIPEFLOW							0.012	7.2	402.00	0.93	10.63
A5							0.009	INITIAL	959.00	12.80	
	Commercial	3.05	2.94	0.86	7.71						12.80
CONFLUENCE A4 AND A5						12.29					12.80
PIPEFLOW							0.009	8.1	111.00	0.23	13.03
CONFLUENCE PIPEFLOW						24.54					13.03
PIPEFLOW							0.011	9.28	273.00	0.49	13.52
OA1							0.034		823.00	10.00	
	C Grass, Concrete	0.86	3.36	0.86	2.49						10.00
						2.49					
OB1							0.008		374.00	9.90	
	C Grass, Concrete	0.32	3.38	0.86	0.93						9.90
						0.93					

Appendix B

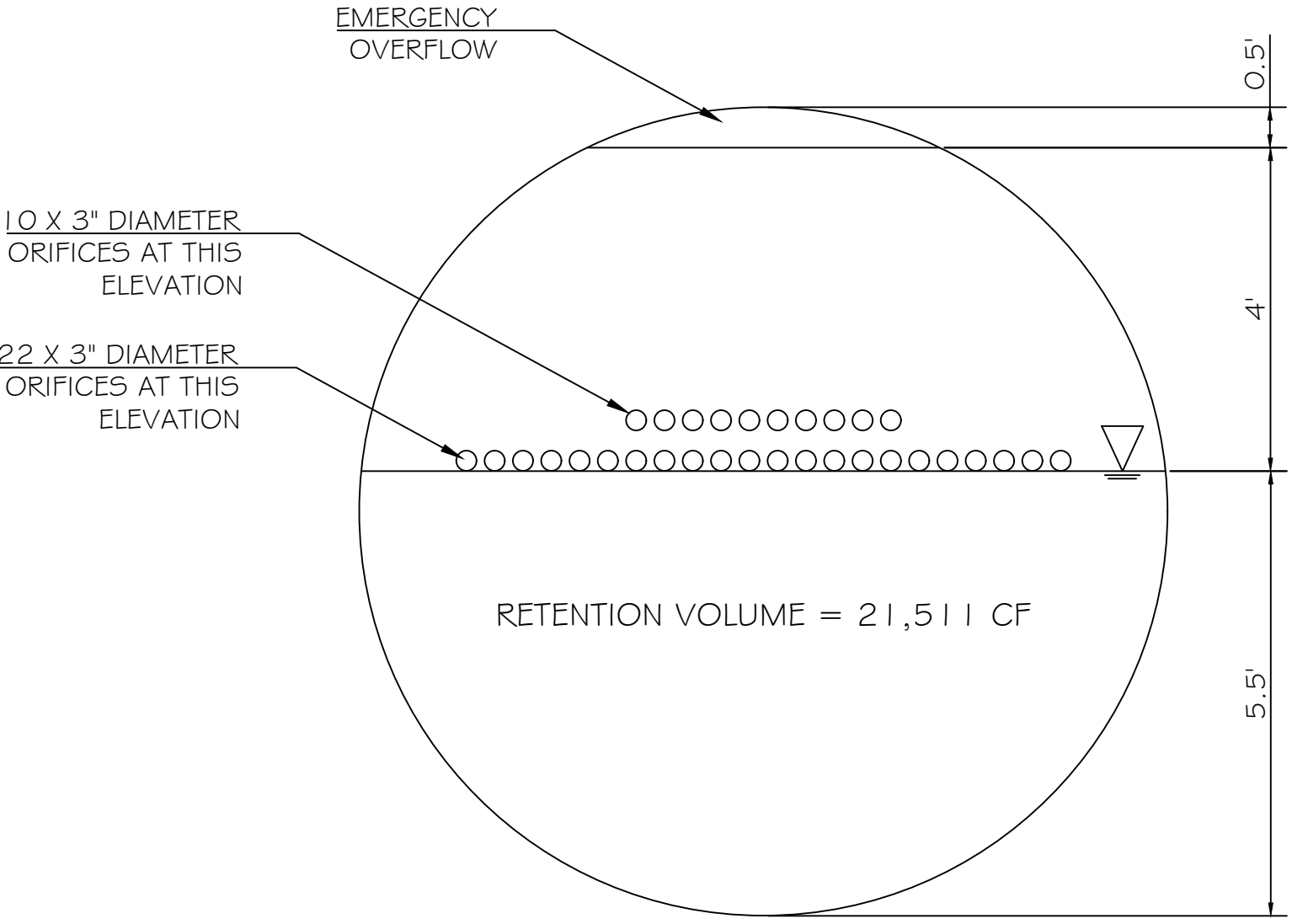
IN THE CITY OF MENIFEE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

BOULDER MENIFEE MIXED USE DEVELOPMENT

PRELIMINARY WATER QUALITY MANAGEMENT PLAN - DETAILS



DETENTION/RETENTION SYSTEM DETAILS



OUTLET STRUCTURE DETAIL

DETENTION CHAMBER HYDRAULICS (Stage vs. Discharge)

V = Volume at depth d	V	ft ³
D = Depth of basin ponding	d	ft
Elevation of weir crest	10	ft
Height of weir above the crest	0.5	ft
Horizontal weir length	0.5	ft
Number of Orifice Openings	1	
Orifice Diameter	0.5	in
Number of Orifice Openings	22	
Orifice Diameter	3	in
Number of Orifice Openings	10	
Orifice Diameter	3	in

Basin Outlet is 24" HDPE with 1% slope (see pipe hydraulics)

Stage d (ft)	Storage V (ft ³)	Storage V (acre-ft)	Orifice @ 0"	Orifice @ 5.5'	Orifice @ 6'	Weir @ 9.5'	Total Outflow
			Discharge Q _{out} (ft ³ /s)	Discharge Q _{out} (ft ³ /s)	Discharge Q _{out} (ft ³ /s)	Discharge Q _{out} (ft ³ /s)	Discharge Q (ft ³ /s)
0.00	0.00	0.0000	0.00			0.00	0.00
0.50	713.52	0.0164	0.00			0.00	0.00
1.00	1986.54	0.0456	0.01			0.00	0.01
1.50	3590.31	0.0824	0.01			0.00	0.01
2.00	5434.64	0.1248	0.01			0.00	0.01
2.50	7462.35	0.1713	0.01			0.00	0.01
3.00	9630.98	0.2211	0.01			0.00	0.01
3.50	11906.05	0.2733	0.01			0.00	0.01
4.00	14257.77	0.3273	0.01			0.00	0.01
4.50	16659.23	0.3824	0.01			0.00	0.01
5.00	19085.18	0.4381	0.01			0.00	0.01
5.50	21511.12	0.4938	0.02	0.00		0.00	0.02
6.00	23912.58	0.5490	0.02	3.18	0.00	0.00	3.20
6.50	26264.30	0.6029	0.02	4.86	1.45	0.00	6.33
7.00	28539.37	0.6552	0.02	6.10	1.87	0.00	7.98
7.50	30708.00	0.7050	0.02	7.12	2.51	0.00	9.64
8.00	32735.71	0.7515	0.02	8.01	3.01	0.00	11.04
8.50	34580.04	0.7938	0.02	8.82	3.45	0.00	12.28
9.00	36183.81	0.8307	0.02	9.55	3.83	0.00	13.40
9.50	37456.83	0.8599	0.02	10.24	4.18	0.00	14.43
10.00	38170.35	0.8763	0.02	10.88	4.50	0.00	15.40

Adjusted 100 Year Storm Peak Flow Time of Concentration

$$Q = C_o A_o (2gH_o)^{0.5}$$

Q = the orifice Flow rate, m³/s (ft³/s)

C_o = discharge coefficient (0.40 - 0.60)

A_o = area of orifice, m² (ft²)

H_o = effective head on the orifice measured from the centroid of the opening, m (ft)

g = gravitational acceleration, 9.81 m/s² (32.2 ft/s² for English units)

$$Q = C_{scw} L H^{1.5}$$

Q = discharge, m³/s (ft³/s)

L = horizontal weir length, m (ft)

H = head above weir crest excluding velocity head, m (ft)

C_{scw} = 1.81 + 0.22 (H/H_c) [3.27 + 0.4 (H/H_c) in English units]

Completed by:	RJD
Checked by:	JHJ
Date:	10/24/2020
Sheet:	1 of 1

Unit Hydrograph Analysis

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Study date 10/09/20 File: boulders310.out

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

Program License Serial Number 6387

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

English Units used in output format

EXISTING CONDITION

Drainage Area = 9.48(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.48(Ac.) =
0.015 Sq. Mi.
Length along longest watercourse = 543.00(Ft.)
Length along longest watercourse measured to centroid = 375.00(Ft.)
Length along longest watercourse = 0.103 Mi.
Length along longest watercourse measured to centroid = 0.071 Mi.
Difference in elevation = 25.00(Ft.)
Slope along watercourse = 243.0939 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.039 Hr.
Lag time = 2.35 Min.
25% of lag time = 0.59 Min.
40% of lag time = 0.94 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]
9.48	0.87	8.22

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	2.28	21.61

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.867(In)
Area Averaged 100-Year Rainfall = 2.280(In)

Point rain (area averaged) = 1.448(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.448(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.480	92.00	0.000

Total Area Entered = 9.48(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
92.0	92.0	0.104	0.000	0.104	1.000	0.104
Sum (F) =						0.104

Area averaged mean soil loss (F) (In/Hr) = 0.104
Minimum soil loss rate ((In/Hr)) = 0.052
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.800

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	213.122	45.580	4.355
2 0.167	426.245	42.462	4.057
3 0.250	639.367	8.285	0.792
4 0.333	852.490	3.672	0.351
Sum = 100.000		Sum=	9.554

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.08	1.30	0.226	0.104	(0.181)	0.122
2	0.17	1.30	0.226	0.104	(0.181)	0.122
3	0.25	1.10	0.191	0.104	(0.153)	0.087
4	0.33	1.50	0.261	0.104	(0.209)	0.157
5	0.42	1.50	0.261	0.104	(0.209)	0.157
6	0.50	1.80	0.313	0.104	(0.250)	0.209
7	0.58	1.50	0.261	0.104	(0.209)	0.157
8	0.67	1.80	0.313	0.104	(0.250)	0.209
9	0.75	1.80	0.313	0.104	(0.250)	0.209
10	0.83	1.50	0.261	0.104	(0.209)	0.157
11	0.92	1.60	0.278	0.104	(0.222)	0.174
12	1.00	1.80	0.313	0.104	(0.250)	0.209
13	1.08	2.20	0.382	0.104	(0.306)	0.278
14	1.17	2.20	0.382	0.104	(0.306)	0.278
15	1.25	2.20	0.382	0.104	(0.306)	0.278
16	1.33	2.00	0.348	0.104	(0.278)	0.244
17	1.42	2.60	0.452	0.104	(0.361)	0.348
18	1.50	2.70	0.469	0.104	(0.375)	0.365
19	1.58	2.40	0.417	0.104	(0.334)	0.313
20	1.67	2.70	0.469	0.104	(0.375)	0.365
21	1.75	3.30	0.574	0.104	(0.459)	0.470
22	1.83	3.10	0.539	0.104	(0.431)	0.435
23	1.92	2.90	0.504	0.104	(0.403)	0.400
24	2.00	3.00	0.521	0.104	(0.417)	0.417
25	2.08	3.10	0.539	0.104	(0.431)	0.435
26	2.17	4.20	0.730	0.104	(0.584)	0.626
27	2.25	5.00	0.869	0.104	(0.695)	0.765
28	2.33	3.50	0.608	0.104	(0.487)	0.504
29	2.42	6.80	1.182	0.104	(0.945)	1.078
30	2.50	7.30	1.269	0.104	(1.015)	1.165
31	2.58	8.20	1.425	0.104	(1.140)	1.321
32	2.67	5.90	1.025	0.104	(0.820)	0.921
33	2.75	2.00	0.348	0.104	(0.278)	0.244
34	2.83	1.80	0.313	0.104	(0.250)	0.209
35	2.92	1.80	0.313	0.104	(0.250)	0.209
36	3.00	0.60	0.104	(0.104)	0.083	0.021

(Loss Rate Not Used)

Sum = 100.0

Sum = 13.7

Flood volume = Effective rainfall 1.14(In)

times area 9.5(Ac.)/[(In)/(Ft.)] = 0.9(Ac.Ft)

Total soil loss = 0.31(In)

Total soil loss = 0.245(Ac.Ft)

Total rainfall = 1.45(In)

Flood volume = 39160.4 Cubic Feet

Total soil loss = 10677.7 Cubic Feet

Peak flow rate of this hydrograph = 11.514(CFS)

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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	5.0	10.0	15.0	20.0
0+ 5	0.0037	0.53	VQ					
0+10	0.0107	1.03	V Q					
0+15	0.0174	0.97	VQ					
0+20	0.0255	1.18	VQ					
0+25	0.0354	1.43	VQ					
0+30	0.0471	1.70	VQ					
0+35	0.0588	1.71	VQ					
0+40	0.0710	1.77	Q					
0+45	0.0845	1.95	Q					
0+50	0.0965	1.75	QV					
0+55	0.1078	1.63	QV					
1+ 0	0.1203	1.81	Q V					
1+ 5	0.1358	2.25	Q V					
1+10	0.1535	2.57	QV					
1+15	0.1716	2.64	Q V					
1+20	0.1889	2.51	Q V					
1+25	0.2084	2.82	Q V					
1+30	0.2310	3.29	Q V					
1+35	0.2531	3.21	Q V					
1+40	0.2757	3.27	Q V					
1+45	0.3026	3.90	Q V					
1+50	0.3315	4.20	Q V					
1+55	0.3591	4.01	Q V					
2+ 0	0.3863	3.95	Q V					
2+ 5	0.4142	4.06	Q V					
2+10	0.4484	4.96	Q V					
2+15	0.4923	6.36	Q V					
2+20	0.5332	5.95	Q V					
2+25	0.5854	7.57	Q V					
2+30	0.6550	10.12	Q V					
2+35	0.7343	11.51	Q V					
2+40	0.8079	10.68	Q V					
2+45	0.8510	6.26	Q V					
2+50	0.8723	3.09	Q V					
2+55	0.8879	2.27	Q V					
3+ 0	0.8961	1.19	Q V					
3+ 5	0.8983	0.32	Q V					
3+10	0.8989	0.09	Q V					

3+15

0.8990

0.01 Q

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Unit Hydrograph Analysis

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Study date 10/09/20 File: boulders610.out

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

Program License Serial Number 6387

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

English Units used in output format

EXISTING CONDITION

Drainage Area = 9.48(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.48(Ac.) =
0.015 Sq. Mi.
Length along longest watercourse = 543.00(Ft.)
Length along longest watercourse measured to centroid = 375.00(Ft.)
Length along longest watercourse = 0.103 Mi.
Length along longest watercourse measured to centroid = 0.071 Mi.
Difference in elevation = 25.00(Ft.)
Slope along watercourse = 243.0939 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.039 Hr.
Lag time = 2.35 Min.
25% of lag time = 0.59 Min.
40% of lag time = 0.94 Min.
Unit time = 10.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	1.57	14.88

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	2.99	28.35

STORM EVENT (YEAR) = 10.00
 Area Averaged 2-Year Rainfall = 1.570(In)
 Area Averaged 100-Year Rainfall = 2.990(In)

Point rain (area averaged) = 2.154(In)
 Areal adjustment factor = 100.00 %
 Adjusted average point rain = 2.154(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.480	92.00	0.000

Total Area Entered = 9.48(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
92.0	92.0	0.104	0.000	0.104	1.000	0.104
Sum (F) =						0.104

Area averaged mean soil loss (F) (In/Hr) = 0.104
 Minimum soil loss rate ((In/Hr)) = 0.052
 (for 24 hour storm duration)
 Soil low loss rate (decimal) = 0.800

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.167	426.245	66.811	6.383
2 0.333	852.490	33.189	3.171
Sum = 100.000		Sum=	9.554

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.17	1.10	0.142	0.104	(0.114)	0.038
2	0.33	1.20	0.155	0.104	(0.124)	0.051
3	0.50	1.30	0.168	0.104	(0.134)	0.064
4	0.67	1.40	0.181	0.104	(0.145)	0.077
5	0.83	1.40	0.181	0.104	(0.145)	0.077
6	1.00	1.50	0.194	0.104	(0.155)	0.090
7	1.17	1.60	0.207	0.104	(0.165)	0.103
8	1.33	1.60	0.207	0.104	(0.165)	0.103
9	1.50	1.60	0.207	0.104	(0.165)	0.103
10	1.67	1.60	0.207	0.104	(0.165)	0.103
11	1.83	1.60	0.207	0.104	(0.165)	0.103
12	2.00	1.70	0.220	0.104	(0.176)	0.116
13	2.17	1.70	0.220	0.104	(0.176)	0.116
14	2.33	1.80	0.233	0.104	(0.186)	0.129
15	2.50	1.80	0.233	0.104	(0.186)	0.129
16	2.67	1.80	0.233	0.104	(0.186)	0.129
17	2.83	2.00	0.258	0.104	(0.207)	0.154
18	3.00	2.00	0.258	0.104	(0.207)	0.154
19	3.17	2.10	0.271	0.104	(0.217)	0.167
20	3.33	2.20	0.284	0.104	(0.227)	0.180
21	3.50	2.50	0.323	0.104	(0.258)	0.219
22	3.67	2.80	0.362	0.104	(0.290)	0.258
23	3.83	3.00	0.388	0.104	(0.310)	0.284
24	4.00	3.20	0.414	0.104	(0.331)	0.310
25	4.17	3.50	0.452	0.104	(0.362)	0.348
26	4.33	3.90	0.504	0.104	(0.403)	0.400
27	4.50	4.20	0.543	0.104	(0.434)	0.439
28	4.67	4.50	0.582	0.104	(0.465)	0.478
29	4.83	4.80	0.620	0.104	(0.496)	0.516
30	5.00	5.10	0.659	0.104	(0.527)	0.555
31	5.17	6.70	0.866	0.104	(0.693)	0.762
32	5.33	8.10	1.047	0.104	(0.838)	0.943
33	5.50	10.30	1.331	0.104	(1.065)	1.227
34	5.67	2.80	0.362	0.104	(0.290)	0.258
35	5.83	1.10	0.142	0.104	(0.114)	0.038
36	6.00	0.50	0.065	(0.104)	0.052	0.013

(Loss Rate Not Used)

Sum = 100.0

Sum = 9.2

Flood volume = Effective rainfall 1.54(In)
times area 9.5(Ac.)/[(In)/(Ft.)] = 1.2(Ac.Ft)
Total soil loss = 0.62(In)
Total soil loss = 0.486(Ac.Ft)
Total rainfall = 2.15(In)
Flood volume = 52955.4 Cubic Feet
Total soil loss = 21173.4 Cubic Feet

Peak flow rate of this hydrograph = 10.829(CFS)

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

Hydrograph in 10 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+10	0.0034	0.24	Q					
0+20	0.0095	0.45	Q					
0+30	0.0174	0.57	VQ					
0+40	0.0270	0.69	VQ					
0+50	0.0371	0.74	Q					
1+ 0	0.0484	0.82	Q					
1+10	0.0613	0.94	QV					
1+20	0.0749	0.98	QV					
1+30	0.0884	0.98	QV					
1+40	0.1019	0.98	Q V					
1+50	0.1155	0.98	Q V					
2+ 0	0.1301	1.07	Q V					
2+10	0.1454	1.11	Q V					
2+20	0.1617	1.19	Q V					
2+30	0.1787	1.23	Q V					
2+40	0.1956	1.23	Q V					
2+50	0.2148	1.39	Q V					
3+ 0	0.2352	1.48	Q V					
3+10	0.2567	1.56	Q V					
3+20	0.2798	1.68	Q V					
3+30	0.3070	1.97	Q V					
3+40	0.3393	2.34	Q V					
3+50	0.3755	2.63	Q V					
4+ 0	0.4151	2.88	Q V					
4+10	0.4593	3.21	Q V					
4+20	0.5097	3.66	Q V					
4+30	0.5658	4.07	Q V					
4+40	0.6270	4.44	Q V					
4+50	0.6933	4.81	Q V					
5+ 0	0.7647	5.18	Q V					
5+10	0.8560	6.63	Q V					
5+20	0.9722	8.44	Q V					
5+30	1.1214	10.83	Q V					
5+40	1.1977	5.54	Q V					
5+50	1.2123	1.06	Q V					
6+ 0	1.2151	0.20	Q V					
6+10	1.2157	0.04	Q V					

Unit Hydrograph Analysis

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Study date 10/09/20 File: boulders2410.out

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

Program License Serial Number 6387

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

English Units used in output format

EXISTING CONDITION

Drainage Area = 9.48(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.48(Ac.) =
0.015 Sq. Mi.
Length along longest watercourse = 543.00(Ft.)
Length along longest watercourse measured to centroid = 375.00(Ft.)
Length along longest watercourse = 0.103 Mi.
Length along longest watercourse measured to centroid = 0.071 Mi.
Difference in elevation = 25.00(Ft.)
Slope along watercourse = 243.0939 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.039 Hr.
Lag time = 2.35 Min.
25% of lag time = 0.59 Min.
40% of lag time = 0.94 Min.
Unit time = 15.00 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]
9.48	2.03	19.24

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	5.32	50.43

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.030(In)
Area Averaged 100-Year Rainfall = 5.320(In)

Point rain (area averaged) = 3.384(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.383(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.480	92.00	0.000

Total Area Entered = 9.48(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
92.0	92.0	0.104	0.000	0.104	1.000	0.104
Sum (F) =						0.104

Area averaged mean soil loss (F) (In/Hr) = 0.104
Minimum soil loss rate ((In/Hr)) = 0.052
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.800

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	639.367	76.650	7.323
2 0.500	1278.735	23.350	2.231
Sum = 100.000		Sum=	9.554

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.25	0.20	0.027	(0.184)	0.022	0.005
2	0.50	0.30	0.041	(0.182)	0.032	0.008
3	0.75	0.30	0.041	(0.179)	0.032	0.008
4	1.00	0.40	0.054	(0.177)	0.043	0.011
5	1.25	0.30	0.041	(0.175)	0.032	0.008
6	1.50	0.30	0.041	(0.173)	0.032	0.008
7	1.75	0.30	0.041	(0.171)	0.032	0.008
8	2.00	0.40	0.054	(0.169)	0.043	0.011
9	2.25	0.40	0.054	(0.167)	0.043	0.011
10	2.50	0.40	0.054	(0.165)	0.043	0.011
11	2.75	0.50	0.068	(0.163)	0.054	0.014
12	3.00	0.50	0.068	(0.161)	0.054	0.014
13	3.25	0.50	0.068	(0.159)	0.054	0.014
14	3.50	0.50	0.068	(0.157)	0.054	0.014
15	3.75	0.50	0.068	(0.155)	0.054	0.014
16	4.00	0.60	0.081	(0.153)	0.065	0.016
17	4.25	0.60	0.081	(0.151)	0.065	0.016
18	4.50	0.70	0.095	(0.149)	0.076	0.019
19	4.75	0.70	0.095	(0.147)	0.076	0.019
20	5.00	0.80	0.108	(0.145)	0.087	0.022
21	5.25	0.60	0.081	(0.143)	0.065	0.016
22	5.50	0.70	0.095	(0.142)	0.076	0.019
23	5.75	0.80	0.108	(0.140)	0.087	0.022
24	6.00	0.80	0.108	(0.138)	0.087	0.022
25	6.25	0.90	0.122	(0.136)	0.097	0.024
26	6.50	0.90	0.122	(0.134)	0.097	0.024
27	6.75	1.00	0.135	(0.132)	0.108	0.027
28	7.00	1.00	0.135	(0.131)	0.108	0.027
29	7.25	1.00	0.135	(0.129)	0.108	0.027
30	7.50	1.10	0.149	(0.127)	0.119	0.030
31	7.75	1.20	0.162	0.125	(0.130)	0.037
32	8.00	1.30	0.176	0.124	(0.141)	0.052
33	8.25	1.50	0.203	0.122	(0.162)	0.081
34	8.50	1.50	0.203	0.120	(0.162)	0.083
35	8.75	1.60	0.217	0.119	(0.173)	0.098
36	9.00	1.70	0.230	0.117	(0.184)	0.113
37	9.25	1.90	0.257	0.115	(0.206)	0.142
38	9.50	2.00	0.271	0.114	(0.217)	0.157
39	9.75	2.10	0.284	0.112	(0.227)	0.172
40	10.00	2.20	0.298	0.110	(0.238)	0.187
41	10.25	1.50	0.203	0.109	(0.162)	0.094
42	10.50	1.50	0.203	0.107	(0.162)	0.096
43	10.75	2.00	0.271	0.106	(0.217)	0.165
44	11.00	2.00	0.271	0.104	(0.217)	0.167
45	11.25	1.90	0.257	0.103	(0.206)	0.155
46	11.50	1.90	0.257	0.101	(0.206)	0.156
47	11.75	1.70	0.230	0.100	(0.184)	0.131

48	12.00	1.80	0.244	0.098	(0.195)	0.146
49	12.25	2.50	0.338	0.097	(0.271)	0.242
50	12.50	2.60	0.352	0.095	(0.282)	0.257
51	12.75	2.80	0.379	0.094	(0.303)	0.285
52	13.00	2.90	0.392	0.092	(0.314)	0.300
53	13.25	3.40	0.460	0.091	(0.368)	0.369
54	13.50	3.40	0.460	0.090	(0.368)	0.371
55	13.75	2.30	0.311	0.088	(0.249)	0.223
56	14.00	2.30	0.311	0.087	(0.249)	0.224
57	14.25	2.70	0.365	0.086	(0.292)	0.280
58	14.50	2.60	0.352	0.084	(0.282)	0.268
59	14.75	2.60	0.352	0.083	(0.282)	0.269
60	15.00	2.50	0.338	0.082	(0.271)	0.257
61	15.25	2.40	0.325	0.080	(0.260)	0.244
62	15.50	2.30	0.311	0.079	(0.249)	0.232
63	15.75	1.90	0.257	0.078	(0.206)	0.179
64	16.00	1.90	0.257	0.077	(0.206)	0.180
65	16.25	0.40	0.054	(0.076)	0.043	0.011
66	16.50	0.40	0.054	(0.074)	0.043	0.011
67	16.75	0.30	0.041	(0.073)	0.032	0.008
68	17.00	0.30	0.041	(0.072)	0.032	0.008
69	17.25	0.50	0.068	(0.071)	0.054	0.014
70	17.50	0.50	0.068	(0.070)	0.054	0.014
71	17.75	0.50	0.068	(0.069)	0.054	0.014
72	18.00	0.40	0.054	(0.068)	0.043	0.011
73	18.25	0.40	0.054	(0.067)	0.043	0.011
74	18.50	0.40	0.054	(0.066)	0.043	0.011
75	18.75	0.30	0.041	(0.065)	0.032	0.008
76	19.00	0.20	0.027	(0.064)	0.022	0.005
77	19.25	0.30	0.041	(0.063)	0.032	0.008
78	19.50	0.40	0.054	(0.062)	0.043	0.011
79	19.75	0.30	0.041	(0.061)	0.032	0.008
80	20.00	0.20	0.027	(0.061)	0.022	0.005
81	20.25	0.30	0.041	(0.060)	0.032	0.008
82	20.50	0.30	0.041	(0.059)	0.032	0.008
83	20.75	0.30	0.041	(0.058)	0.032	0.008
84	21.00	0.20	0.027	(0.058)	0.022	0.005
85	21.25	0.30	0.041	(0.057)	0.032	0.008
86	21.50	0.20	0.027	(0.056)	0.022	0.005
87	21.75	0.30	0.041	(0.056)	0.032	0.008
88	22.00	0.20	0.027	(0.055)	0.022	0.005
89	22.25	0.30	0.041	(0.055)	0.032	0.008
90	22.50	0.20	0.027	(0.054)	0.022	0.005
91	22.75	0.20	0.027	(0.054)	0.022	0.005
92	23.00	0.20	0.027	(0.053)	0.022	0.005
93	23.25	0.20	0.027	(0.053)	0.022	0.005
94	23.50	0.20	0.027	(0.052)	0.022	0.005
95	23.75	0.20	0.027	(0.052)	0.022	0.005
96	24.00	0.20	0.027	(0.052)	0.022	0.005

(Loss Rate Not Used)

Sum = 100.0 Sum = 7.2
 Flood volume = Effective rainfall 1.79(In)
 times area 9.5(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)
 Total soil loss = 1.59(In)
 Total soil loss = 1.259(Ac.Ft)
 Total rainfall = 3.38(In)
 Flood volume = 61591.3 Cubic Feet
 Total soil loss = 54842.1 Cubic Feet

 Peak flow rate of this hydrograph = 3.540(CFS)

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

 Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0008		0.04	Q				
0+30	0.0023		0.07	Q				
0+45	0.0039		0.08	Q				
1+ 0	0.0059		0.10	Q				
1+15	0.0076		0.08	Q				
1+30	0.0092		0.08	Q				
1+45	0.0109		0.08	Q				
2+ 0	0.0129		0.10	Q				
2+15	0.0150		0.10	Q				
2+30	0.0171		0.10	Q				
2+45	0.0197		0.12	Q				
3+ 0	0.0224		0.13	Q				
3+15	0.0250		0.13	Q				
3+30	0.0277		0.13	Q				
3+45	0.0304		0.13	Q				
4+ 0	0.0335		0.15	Q				
4+15	0.0367		0.16	QV				
4+30	0.0403		0.18	QV				
4+45	0.0440		0.18	QV				
5+ 0	0.0482		0.20	QV				
5+15	0.0516		0.17	QV				
5+30	0.0553		0.18	QV				
5+45	0.0594		0.20	QV				
6+ 0	0.0637		0.21	QV				
6+15	0.0684		0.23	QV				
6+30	0.0732		0.23	Q V				
6+45	0.0784		0.25	QV				
7+ 0	0.0838		0.26	QV				
7+15	0.0891		0.26	QV				
7+30	0.0949		0.28	QV				

7+45	0.1018	0.34	QV					
8+ 0	0.1115	0.47	Q V					
8+15	0.1261	0.71	QV					
8+30	0.1424	0.79	QV					
8+45	0.1611	0.90	QV					
9+ 0	0.1827	1.05	QV					
9+15	0.2094	1.29	Q					
9+30	0.2397	1.47	QV					
9+45	0.2731	1.61	QV					
10+ 0	0.3094	1.76	QV					
10+15	0.3323	1.11	Q	V				
10+30	0.3511	0.91	Q	V				
10+45	0.3805	1.42	Q	V				
11+ 0	0.4134	1.59	Q	V				
11+15	0.4445	1.50	Q	V				
11+30	0.4752	1.49	Q	V				
11+45	0.5022	1.30	Q	V				
12+ 0	0.5302	1.36	Q	V				
12+15	0.5735	2.10	Q	V				
12+30	0.6236	2.42	Q	V				
12+45	0.6786	2.66	Q	V				
13+ 0	0.7372	2.84	Q	V				
13+15	0.8069	3.38	Q	V				
13+30	0.8800	3.54	Q	V				
13+45	0.9309	2.46	Q	V				
14+ 0	0.9752	2.14	Q	V				
14+15	1.0279	2.55	Q	V				
14+30	1.0813	2.59	Q	V				
14+45	1.1344	2.57	Q	V				
15+ 0	1.1857	2.48	Q	V				
15+15	1.2345	2.36	Q	V				
15+30	1.2809	2.25	Q	V				
15+45	1.3187	1.83	Q	V				
16+ 0	1.3543	1.72	Q	V				
16+15	1.3643	0.48	Q	V				
16+30	1.3664	0.10	Q	V				
16+45	1.3681	0.08	Q	V				
17+ 0	1.3697	0.08	Q	V				
17+15	1.3722	0.12	Q	V				
17+30	1.3748	0.13	Q	V				
17+45	1.3775	0.13	Q	V				
18+ 0	1.3798	0.11	Q	V				
18+15	1.3819	0.10	Q	V				
18+30	1.3840	0.10	Q	V				
18+45	1.3858	0.08	Q	V				
19+ 0	1.3870	0.06	Q	V				
19+15	1.3884	0.07	Q	V				
19+30	1.3905	0.10	Q	V				
19+45	1.3922	0.08	Q	V				
20+ 0	1.3934	0.06	Q	V				

20+15	1.3949	0.07	Q				V
20+30	1.3965	0.08	Q				V
20+45	1.3981	0.08	Q				V
21+ 0	1.3993	0.06	Q				V
21+15	1.4007	0.07	Q				V
21+30	1.4019	0.06	Q				V
21+45	1.4034	0.07	Q				V
22+ 0	1.4046	0.06	Q				V
22+15	1.4061	0.07	Q				V
22+30	1.4073	0.06	Q				V
22+45	1.4083	0.05	Q				V
23+ 0	1.4094	0.05	Q				V
23+15	1.4105	0.05	Q				V
23+30	1.4116	0.05	Q				V
23+45	1.4126	0.05	Q				V
24+ 0	1.4137	0.05	Q				V
24+15	1.4139	0.01	Q				V

Unit Hydrograph Analysis

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Study date 10/09/20 File: boulders3100.out

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

Program License Serial Number 6387

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

English Units used in output format

EXISTING CONDITION

Drainage Area = 9.48(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.48(Ac.) =
0.015 Sq. Mi.
Length along longest watercourse = 543.00(Ft.)
Length along longest watercourse measured to centroid = 375.00(Ft.)
Length along longest watercourse = 0.103 Mi.
Length along longest watercourse measured to centroid = 0.071 Mi.
Difference in elevation = 25.00(Ft.)
Slope along watercourse = 243.0939 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.039 Hr.
Lag time = 2.35 Min.
25% of lag time = 0.59 Min.
40% of lag time = 0.94 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]
9.48	0.87	8.22

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	2.28	21.61

STORM EVENT (YEAR) = 100.00

Area Averaged 2-Year Rainfall = 0.867(In)

Area Averaged 100-Year Rainfall = 2.280(In)

Point rain (area averaged) = 2.280(In)

Areal adjustment factor = 100.00 %

Adjusted average point rain = 2.280(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.480	92.00	0.000
Total Area Entered = 9.48(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
92.0	96.8	0.042	0.000	0.042	1.000	0.042
Sum (F) =						0.042

Area averaged mean soil loss (F) (In/Hr) = 0.042

Minimum soil loss rate ((In/Hr)) = 0.021

(for 24 hour storm duration)

Soil loss rate (decimal) = 0.800

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	213.122	45.580	4.355
2 0.167	426.245	42.462	4.057
3 0.250	639.367	8.285	0.792
4 0.333	852.490	3.672	0.351
Sum = 100.000		Sum=	9.554

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.08	1.30	0.356	0.042	(0.285)	0.314
2	0.17	1.30	0.356	0.042	(0.285)	0.314
3	0.25	1.10	0.301	0.042	(0.241)	0.259
4	0.33	1.50	0.410	0.042	(0.328)	0.369
5	0.42	1.50	0.410	0.042	(0.328)	0.369
6	0.50	1.80	0.492	0.042	(0.394)	0.451
7	0.58	1.50	0.410	0.042	(0.328)	0.369
8	0.67	1.80	0.492	0.042	(0.394)	0.451
9	0.75	1.80	0.492	0.042	(0.394)	0.451
10	0.83	1.50	0.410	0.042	(0.328)	0.369
11	0.92	1.60	0.438	0.042	(0.350)	0.396
12	1.00	1.80	0.492	0.042	(0.394)	0.451
13	1.08	2.20	0.602	0.042	(0.482)	0.560
14	1.17	2.20	0.602	0.042	(0.482)	0.560
15	1.25	2.20	0.602	0.042	(0.482)	0.560
16	1.33	2.00	0.547	0.042	(0.438)	0.506
17	1.42	2.60	0.711	0.042	(0.569)	0.670
18	1.50	2.70	0.739	0.042	(0.591)	0.697
19	1.58	2.40	0.657	0.042	(0.525)	0.615
20	1.67	2.70	0.739	0.042	(0.591)	0.697
21	1.75	3.30	0.903	0.042	(0.722)	0.861
22	1.83	3.10	0.848	0.042	(0.678)	0.807
23	1.92	2.90	0.793	0.042	(0.635)	0.752
24	2.00	3.00	0.821	0.042	(0.657)	0.779
25	2.08	3.10	0.848	0.042	(0.678)	0.807
26	2.17	4.20	1.149	0.042	(0.919)	1.107
27	2.25	5.00	1.368	0.042	(1.094)	1.326
28	2.33	3.50	0.958	0.042	(0.766)	0.916
29	2.42	6.80	1.860	0.042	(1.488)	1.819
30	2.50	7.30	1.997	0.042	(1.598)	1.956
31	2.58	8.20	2.243	0.042	(1.795)	2.202
32	2.67	5.90	1.614	0.042	(1.291)	1.573
33	2.75	2.00	0.547	0.042	(0.438)	0.506
34	2.83	1.80	0.492	0.042	(0.394)	0.451
35	2.92	1.80	0.492	0.042	(0.394)	0.451
36	3.00	0.60	0.164	0.042	(0.131)	0.123

(Loss Rate Not Used)

Sum = 100.0

Sum = 25.9

Flood volume = Effective rainfall 2.16(In)

times area 9.5(Ac.)/[(In)/(Ft.)] = 1.7(Ac.Ft)

Total soil loss = 0.12(In)

Total soil loss = 0.099(Ac.Ft)

Total rainfall = 2.28(In)

Flood volume = 74162.4 Cubic Feet

Total soil loss = 4294.7 Cubic Feet

Peak flow rate of this hydrograph = 19.293(CFS)

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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 5.0 10.0 15.0 20.0

0+ 5	0.0094	1.37	V Q					
0+10	0.0276	2.64	V Q					
0+15	0.0459	2.65	V Q					
0+20	0.0667	3.02	V Q					
0+25	0.0902	3.42	V Q					
0+30	0.1167	3.84	V Q					
0+35	0.1433	3.86	V Q					
0+40	0.1705	3.95	V Q					
0+45	0.1997	4.24	V Q					
0+50	0.2267	3.92	V Q					
0+55	0.2525	3.74	V Q					
1+ 0	0.2802	4.02	V Q					
1+ 5	0.3126	4.71	V Q					
1+10	0.3485	5.21	V Q					
1+15	0.3852	5.32	VQ					
1+20	0.4204	5.12	VQ					
1+25	0.4590	5.61	VQ					
1+30	0.5028	6.35	VQ					
1+35	0.5456	6.22	Q					
1+40	0.5891	6.32	QV					
1+45	0.6395	7.31	QV					
1+50	0.6931	7.78	QV					
1+55	0.7446	7.48	Q V					
2+ 0	0.7954	7.39	Q V					
2+ 5	0.8475	7.56	Q V					
2+10	0.9093	8.98	Q					
2+15	0.9864	11.19						
2+20	1.0589	10.53						
2+25	1.1490	13.08						
2+30	1.2667	17.09						
2+35	1.3996	19.29						
2+40	1.5234	17.98						
2+45	1.5993	11.02						
2+50	1.6408	6.03						
2+55	1.6735	4.75						
3+ 0	1.6935	2.90						
3+ 5	1.7005	1.01						
3+10	1.7022	0.26						

3+15

1.7025

0.04 Q

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|

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V



Unit Hydrograph Analysis

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Study date 10/09/20 File: boulders6100.out

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

Program License Serial Number 6387

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

English Units used in output format

EXISTING CONDITION

Drainage Area = 9.48(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.48(Ac.) =
0.015 Sq. Mi.
Length along longest watercourse = 543.00(Ft.)
Length along longest watercourse measured to centroid = 375.00(Ft.)
Length along longest watercourse = 0.103 Mi.
Length along longest watercourse measured to centroid = 0.071 Mi.
Difference in elevation = 25.00(Ft.)
Slope along watercourse = 243.0939 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.039 Hr.
Lag time = 2.35 Min.
25% of lag time = 0.59 Min.
40% of lag time = 0.94 Min.
Unit time = 10.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	1.57	14.88

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	2.99	28.35

STORM EVENT (YEAR) = 100.00

Area Averaged 2-Year Rainfall = 1.570(In)

Area Averaged 100-Year Rainfall = 2.990(In)

Point rain (area averaged) = 2.990(In)

Areal adjustment factor = 100.00 %

Adjusted average point rain = 2.990(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.480	92.00	0.000
Total Area Entered = 9.48(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
92.0	96.8	0.042	0.000	0.042	1.000	0.042
Sum (F) =						0.042

Area averaged mean soil loss (F) (In/Hr) = 0.042

Minimum soil loss rate ((In/Hr)) = 0.021

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.800

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.167	426.245	66.811	6.383
2 0.333	852.490	33.189	3.171
Sum = 100.000		Sum=	9.554

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.17	1.10	0.197	0.042	(0.158)	0.156
2	0.33	1.20	0.215	0.042	(0.172)	0.174
3	0.50	1.30	0.233	0.042	(0.187)	0.192
4	0.67	1.40	0.251	0.042	(0.201)	0.210
5	0.83	1.40	0.251	0.042	(0.201)	0.210
6	1.00	1.50	0.269	0.042	(0.215)	0.227
7	1.17	1.60	0.287	0.042	(0.230)	0.245
8	1.33	1.60	0.287	0.042	(0.230)	0.245
9	1.50	1.60	0.287	0.042	(0.230)	0.245
10	1.67	1.60	0.287	0.042	(0.230)	0.245
11	1.83	1.60	0.287	0.042	(0.230)	0.245
12	2.00	1.70	0.305	0.042	(0.244)	0.263
13	2.17	1.70	0.305	0.042	(0.244)	0.263
14	2.33	1.80	0.323	0.042	(0.258)	0.281
15	2.50	1.80	0.323	0.042	(0.258)	0.281
16	2.67	1.80	0.323	0.042	(0.258)	0.281
17	2.83	2.00	0.359	0.042	(0.287)	0.317
18	3.00	2.00	0.359	0.042	(0.287)	0.317
19	3.17	2.10	0.377	0.042	(0.301)	0.335
20	3.33	2.20	0.395	0.042	(0.316)	0.353
21	3.50	2.50	0.448	0.042	(0.359)	0.407
22	3.67	2.80	0.502	0.042	(0.402)	0.461
23	3.83	3.00	0.538	0.042	(0.431)	0.497
24	4.00	3.20	0.574	0.042	(0.459)	0.532
25	4.17	3.50	0.628	0.042	(0.502)	0.586
26	4.33	3.90	0.700	0.042	(0.560)	0.658
27	4.50	4.20	0.753	0.042	(0.603)	0.712
28	4.67	4.50	0.807	0.042	(0.646)	0.766
29	4.83	4.80	0.861	0.042	(0.689)	0.819
30	5.00	5.10	0.915	0.042	(0.732)	0.873
31	5.17	6.70	1.202	0.042	(0.962)	1.160
32	5.33	8.10	1.453	0.042	(1.162)	1.411
33	5.50	10.30	1.848	0.042	(1.478)	1.806
34	5.67	2.80	0.502	0.042	(0.402)	0.461
35	5.83	1.10	0.197	0.042	(0.158)	0.156
36	6.00	0.50	0.090	0.042	(0.072)	0.048

(Loss Rate Not Used)

Sum = 100.0

Sum = 16.4

Flood volume = Effective rainfall 2.74(In)
times area 9.5(Ac.)/[(In)/(Ft.)] = 2.2(Ac.Ft)
Total soil loss = 0.25(In)
Total soil loss = 0.197(Ac.Ft)
Total rainfall = 2.99(In)
Flood volume = 94300.4 Cubic Feet
Total soil loss = 8589.3 Cubic Feet

Peak flow rate of this hydrograph = 16.013(CFS)

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

Hydrograph in 10 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+10	0.0137	0.99	VQ					
0+20	0.0358	1.60	V Q					
0+30	0.0602	1.77	V Q					
0+40	0.0870	1.95	V Q					
0+50	0.1146	2.00	V Q					
1+ 0	0.1438	2.12	V Q					
1+10	0.1753	2.29	VQ					
1+20	0.2076	2.35	VQ					
1+30	0.2400	2.35	Q					
1+40	0.2723	2.35	QV					
1+50	0.3046	2.35	QV					
2+ 0	0.3385	2.46	Q V					
2+10	0.3732	2.52	QV					
2+20	0.4094	2.63	Q V					
2+30	0.4465	2.69	Q V					
2+40	0.4835	2.69	Q V					
2+50	0.5237	2.92	Q V					
3+ 0	0.5654	3.03	Q V					
3+10	0.6088	3.15	Q V					
3+20	0.6545	3.32	Q V					
3+30	0.7057	3.72	Q V					
3+40	0.7640	4.23	Q V					
3+50	0.8278	4.63	Q V					
4+ 0	0.8964	4.98	Q V					
4+10	0.9712	5.43	Q V					
4+20	1.0547	6.06	Q V					
4+30	1.1461	6.63	Q V					
4+40	1.2446	7.15	Q V					
4+50	1.3501	7.66	Q V					
5+ 0	1.4627	8.18	Q V					
5+10	1.6030	10.18	Q V					
5+20	1.7779	12.70	Q V					
5+30	1.9984	16.01	Q V					
5+40	2.1179	8.67	Q					
5+50	2.1517	2.46	Q					
6+ 0	2.1627	0.80	Q					
6+10	2.1648	0.15	Q					

Unit Hydrograph Analysis

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Study date 10/09/20 File: boulders24100.out

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

Program License Serial Number 6387

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

English Units used in output format

EXISTING CONDITION

Drainage Area = 9.48(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.48(Ac.) =
0.015 Sq. Mi.
Length along longest watercourse = 543.00(Ft.)
Length along longest watercourse measured to centroid = 375.00(Ft.)
Length along longest watercourse = 0.103 Mi.
Length along longest watercourse measured to centroid = 0.071 Mi.
Difference in elevation = 25.00(Ft.)
Slope along watercourse = 243.0939 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.039 Hr.
Lag time = 2.35 Min.
25% of lag time = 0.59 Min.
40% of lag time = 0.94 Min.
Unit time = 15.00 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]
9.48	2.03	19.24

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	5.32	50.43

STORM EVENT (YEAR) = 100.00

Area Averaged 2-Year Rainfall = 2.030(In)

Area Averaged 100-Year Rainfall = 5.320(In)

Point rain (area averaged) = 5.320(In)

Areal adjustment factor = 100.00 %

Adjusted average point rain = 5.320(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.480	92.00	0.000
Total Area Entered = 9.48(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
92.0	96.8	0.042	0.000	0.042	1.000	0.042
Sum (F) =						0.042

Area averaged mean soil loss (F) (In/Hr) = 0.042

Minimum soil loss rate ((In/Hr)) = 0.021

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.800

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	639.367	76.650	7.323
2 0.500	1278.735	23.350	2.231
Sum = 100.000		Sum=	9.554

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.25	0.20	0.043	(0.073)	0.034	0.009
2	0.50	0.30	0.064	(0.073)	0.051	0.013
3	0.75	0.30	0.064	(0.072)	0.051	0.013
4	1.00	0.40	0.085	(0.071)	0.068	0.017
5	1.25	0.30	0.064	(0.070)	0.051	0.013
6	1.50	0.30	0.064	(0.069)	0.051	0.013
7	1.75	0.30	0.064	(0.068)	0.051	0.013
8	2.00	0.40	0.085	0.068	(0.068)	0.018
9	2.25	0.40	0.085	0.067	(0.068)	0.018
10	2.50	0.40	0.085	0.066	(0.068)	0.019
11	2.75	0.50	0.106	0.065	(0.085)	0.041
12	3.00	0.50	0.106	0.064	(0.085)	0.042
13	3.25	0.50	0.106	0.064	(0.085)	0.043
14	3.50	0.50	0.106	0.063	(0.085)	0.044
15	3.75	0.50	0.106	0.062	(0.085)	0.044
16	4.00	0.60	0.128	0.061	(0.102)	0.066
17	4.25	0.60	0.128	0.060	(0.102)	0.067
18	4.50	0.70	0.149	0.060	(0.119)	0.089
19	4.75	0.70	0.149	0.059	(0.119)	0.090
20	5.00	0.80	0.170	0.058	(0.136)	0.112
21	5.25	0.60	0.128	0.057	(0.102)	0.070
22	5.50	0.70	0.149	0.057	(0.119)	0.092
23	5.75	0.80	0.170	0.056	(0.136)	0.114
24	6.00	0.80	0.170	0.055	(0.136)	0.115
25	6.25	0.90	0.192	0.054	(0.153)	0.137
26	6.50	0.90	0.192	0.054	(0.153)	0.138
27	6.75	1.00	0.213	0.053	(0.170)	0.160
28	7.00	1.00	0.213	0.052	(0.170)	0.161
29	7.25	1.00	0.213	0.052	(0.170)	0.161
30	7.50	1.10	0.234	0.051	(0.187)	0.183
31	7.75	1.20	0.255	0.050	(0.204)	0.205
32	8.00	1.30	0.277	0.049	(0.221)	0.227
33	8.25	1.50	0.319	0.049	(0.255)	0.270
34	8.50	1.50	0.319	0.048	(0.255)	0.271
35	8.75	1.60	0.340	0.047	(0.272)	0.293
36	9.00	1.70	0.362	0.047	(0.289)	0.315
37	9.25	1.90	0.404	0.046	(0.323)	0.358
38	9.50	2.00	0.426	0.045	(0.340)	0.380
39	9.75	2.10	0.447	0.045	(0.357)	0.402
40	10.00	2.20	0.468	0.044	(0.375)	0.424
41	10.25	1.50	0.319	0.044	(0.255)	0.276
42	10.50	1.50	0.319	0.043	(0.255)	0.276
43	10.75	2.00	0.426	0.042	(0.340)	0.383
44	11.00	2.00	0.426	0.042	(0.340)	0.384
45	11.25	1.90	0.404	0.041	(0.323)	0.363
46	11.50	1.90	0.404	0.040	(0.323)	0.364
47	11.75	1.70	0.362	0.040	(0.289)	0.322

48	12.00	1.80	0.383	0.039	(0.306)	0.344
49	12.25	2.50	0.532	0.039	(0.426)	0.493
50	12.50	2.60	0.553	0.038	(0.443)	0.515
51	12.75	2.80	0.596	0.037	(0.477)	0.558
52	13.00	2.90	0.617	0.037	(0.494)	0.580
53	13.25	3.40	0.724	0.036	(0.579)	0.687
54	13.50	3.40	0.724	0.036	(0.579)	0.688
55	13.75	2.30	0.489	0.035	(0.392)	0.454
56	14.00	2.30	0.489	0.035	(0.392)	0.455
57	14.25	2.70	0.575	0.034	(0.460)	0.540
58	14.50	2.60	0.553	0.034	(0.443)	0.520
59	14.75	2.60	0.553	0.033	(0.443)	0.520
60	15.00	2.50	0.532	0.033	(0.426)	0.499
61	15.25	2.40	0.511	0.032	(0.409)	0.479
62	15.50	2.30	0.489	0.032	(0.392)	0.458
63	15.75	1.90	0.404	0.031	(0.323)	0.373
64	16.00	1.90	0.404	0.031	(0.323)	0.374
65	16.25	0.40	0.085	0.030	(0.068)	0.055
66	16.50	0.40	0.085	0.030	(0.068)	0.055
67	16.75	0.30	0.064	0.029	(0.051)	0.035
68	17.00	0.30	0.064	0.029	(0.051)	0.035
69	17.25	0.50	0.106	0.028	(0.085)	0.078
70	17.50	0.50	0.106	0.028	(0.085)	0.078
71	17.75	0.50	0.106	0.028	(0.085)	0.079
72	18.00	0.40	0.085	0.027	(0.068)	0.058
73	18.25	0.40	0.085	0.027	(0.068)	0.058
74	18.50	0.40	0.085	0.026	(0.068)	0.059
75	18.75	0.30	0.064	0.026	(0.051)	0.038
76	19.00	0.20	0.043	0.026	(0.034)	0.017
77	19.25	0.30	0.064	0.025	(0.051)	0.039
78	19.50	0.40	0.085	0.025	(0.068)	0.060
79	19.75	0.30	0.064	0.025	(0.051)	0.039
80	20.00	0.20	0.043	0.024	(0.034)	0.018
81	20.25	0.30	0.064	0.024	(0.051)	0.040
82	20.50	0.30	0.064	0.024	(0.051)	0.040
83	20.75	0.30	0.064	0.023	(0.051)	0.041
84	21.00	0.20	0.043	0.023	(0.034)	0.020
85	21.25	0.30	0.064	0.023	(0.051)	0.041
86	21.50	0.20	0.043	0.023	(0.034)	0.020
87	21.75	0.30	0.064	0.022	(0.051)	0.042
88	22.00	0.20	0.043	0.022	(0.034)	0.021
89	22.25	0.30	0.064	0.022	(0.051)	0.042
90	22.50	0.20	0.043	0.022	(0.034)	0.021
91	22.75	0.20	0.043	0.021	(0.034)	0.021
92	23.00	0.20	0.043	0.021	(0.034)	0.021
93	23.25	0.20	0.043	0.021	(0.034)	0.021
94	23.50	0.20	0.043	0.021	(0.034)	0.022
95	23.75	0.20	0.043	0.021	(0.034)	0.022
96	24.00	0.20	0.043	0.021	(0.034)	0.022

(Loss Rate Not Used)

Sum = 100.0 Sum = 17.4

Flood volume = Effective rainfall 4.36(In)
 times area 9.5(Ac.)/[(In)/(Ft.)] = 3.4(Ac.Ft)
 Total soil loss = 0.96(In)
 Total soil loss = 0.762(Ac.Ft)
 Total rainfall = 5.32(In)
 Flood volume = 149893.8 Cubic Feet
 Total soil loss = 33176.8 Cubic Feet

 Peak flow rate of this hydrograph = 6.572(CFS)

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

 Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0013	0.06	Q					
0+30	0.0036	0.11	Q					
0+45	0.0061	0.12	Q					
1+ 0	0.0093	0.15	Q					
1+15	0.0120	0.13	Q					
1+30	0.0145	0.12	Q					
1+45	0.0171	0.12	Q					
2+ 0	0.0203	0.16	Q					
2+15	0.0239	0.17	Q					
2+30	0.0276	0.18	Q					
2+45	0.0348	0.34	VQ					
3+ 0	0.0430	0.40	VQ					
3+15	0.0514	0.41	VQ					
3+30	0.0600	0.42	VQ					
3+45	0.0688	0.42	VQ					
4+ 0	0.0809	0.59	V Q					
4+15	0.0941	0.64	VQ					
4+30	0.1107	0.80	V Q					
4+45	0.1285	0.86	V Q					
5+ 0	0.1496	1.02	V Q					
5+15	0.1654	0.77	V Q					
5+30	0.1826	0.83	VQ					
5+45	0.2042	1.04	V Q					
6+ 0	0.2269	1.10	V Q					
6+15	0.2530	1.26	V Q					
6+30	0.2801	1.32	V Q					
6+45	0.3107	1.48	V Q					
7+ 0	0.3424	1.53	V Q					
7+15	0.3742	1.54	V Q					
7+30	0.4094	1.70	V Q					

7+45	0.4489	1.91	V Q				
8+ 0	0.4927	2.12	V Q				
8+15	0.5441	2.49	V Q				
8+30	0.5976	2.59	V Q				
8+45	0.6545	2.75	V Q				
9+ 0	0.7157	2.96	V Q				
9+15	0.7845	3.33	V Q				
9+30	0.8585	3.58	V Q				
9+45	0.9369	3.79	V Q				
10+ 0	1.0197	4.00	V Q				
10+15	1.0810	2.97	QV				
10+30	1.1355	2.64	Q V				
10+45	1.2063	3.43	QV				
11+ 0	1.2821	3.67	Q				
11+15	1.3548	3.52	QV				
11+30	1.4266	3.48	Q V				
11+45	1.4921	3.17	Q V				
12+ 0	1.5590	3.24	Q V				
12+15	1.6496	4.38	Q V				
12+30	1.7503	4.88	QV				
12+45	1.8586	5.24	QV				
13+ 0	1.9722	5.50	QV				
13+15	2.1030	6.33	VQ				
13+30	2.2388	6.57	Q V				
13+45	2.3392	4.86	Q				
14+ 0	2.4290	4.35	Q				
14+15	2.5318	4.97	Q				
14+30	2.6353	5.01	Q				
14+45	2.7380	4.97	Q				
15+ 0	2.8376	4.82	Q				
15+15	2.9331	4.62	Q				
15+30	3.0245	4.42	Q				
15+45	3.1021	3.76	Q				
16+ 0	3.1758	3.57	Q				
16+15	3.2014	1.24	Q				
16+30	3.2123	0.53	Q				
16+45	3.2200	0.38	Q				
17+ 0	3.2269	0.33	Q				
17+15	3.2403	0.65	Q				
17+30	3.2558	0.75	Q				
17+45	3.2713	0.75	Q				
18+ 0	3.2837	0.60	Q				
18+15	3.2952	0.56	Q				
18+30	3.3068	0.56	Q				
18+45	3.3153	0.41	Q				
19+ 0	3.3196	0.21	Q				
19+15	3.3262	0.32	Q				
19+30	3.3371	0.53	Q				
19+45	3.3458	0.42	Q				
20+ 0	3.3504	0.22	Q				

20+15	3.3572	0.33	Q				V
20+30	3.3652	0.38	Q				V
20+45	3.3732	0.39	Q				V
21+ 0	3.3780	0.23	Q				V
21+15	3.3851	0.34	Q				V
21+30	3.3900	0.24	Q				V
21+45	3.3972	0.35	Q				V
22+ 0	3.4023	0.24	Q				V
22+15	3.4096	0.35	Q				V
22+30	3.4147	0.25	Q				V
22+45	3.4188	0.20	Q				V
23+ 0	3.4230	0.20	Q				V
23+15	3.4273	0.20	Q				V
23+30	3.4315	0.21	Q				V
23+45	3.4358	0.21	Q				V
24+ 0	3.4401	0.21	Q				V
24+15	3.4411	0.05	Q				V

Unit Hydrograph Analysis

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

Program License Serial Number 6387

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

English Units used in output format

PROPOSED

Drainage Area = 9.48(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.48(Ac.) =
0.015 Sq. Mi.
Length along longest watercourse = 1046.00(Ft.)
Length along longest watercourse measured to centroid = 593.00(Ft.)
Length along longest watercourse = 0.198 Mi.
Length along longest watercourse measured to centroid = 0.112 Mi.
Difference in elevation = 17.00(Ft.)
Slope along watercourse = 85.8126 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.036 Hr.
Lag time = 2.18 Min.
25% of lag time = 0.55 Min.
40% of lag time = 0.87 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]
9.48	0.87	8.22

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	2.28	21.61

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 0.867(In)
Area Averaged 100-Year Rainfall = 2.280(In)

Point rain (area averaged) = 1.448(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.448(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.480	71.00	0.750

Total Area Entered = 9.48(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
71.0	71.0	0.350	0.750	0.114	1.000	0.114
Sum (F) =						0.114

Area averaged mean soil loss (F) (In/Hr) = 0.114
Minimum soil loss rate ((In/Hr)) = 0.057
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.300

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	229.039	48.008	4.587
2 0.167	458.079	41.392	3.955
3 0.250	687.118	7.724	0.738
4 0.333	916.157	2.876	0.275
Sum = 100.000		Sum=	9.554

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.08	1.30	0.226	(0.114)	0.068	0.158
2	0.17	1.30	0.226	(0.114)	0.068	0.158
3	0.25	1.10	0.191	(0.114)	0.057	0.134
4	0.33	1.50	0.261	(0.114)	0.078	0.182
5	0.42	1.50	0.261	(0.114)	0.078	0.182
6	0.50	1.80	0.313	(0.114)	0.094	0.219
7	0.58	1.50	0.261	(0.114)	0.078	0.182
8	0.67	1.80	0.313	(0.114)	0.094	0.219
9	0.75	1.80	0.313	(0.114)	0.094	0.219
10	0.83	1.50	0.261	(0.114)	0.078	0.182
11	0.92	1.60	0.278	(0.114)	0.083	0.195
12	1.00	1.80	0.313	(0.114)	0.094	0.219
13	1.08	2.20	0.382	0.114 (0.115)		0.269
14	1.17	2.20	0.382	0.114 (0.115)		0.269
15	1.25	2.20	0.382	0.114 (0.115)		0.269
16	1.33	2.00	0.348	(0.114)	0.104	0.243
17	1.42	2.60	0.452	0.114 (0.136)		0.338
18	1.50	2.70	0.469	0.114 (0.141)		0.355
19	1.58	2.40	0.417	0.114 (0.125)		0.303
20	1.67	2.70	0.469	0.114 (0.141)		0.355
21	1.75	3.30	0.574	0.114 (0.172)		0.460
22	1.83	3.10	0.539	0.114 (0.162)		0.425
23	1.92	2.90	0.504	0.114 (0.151)		0.390
24	2.00	3.00	0.521	0.114 (0.156)		0.408
25	2.08	3.10	0.539	0.114 (0.162)		0.425
26	2.17	4.20	0.730	0.114 (0.219)		0.616
27	2.25	5.00	0.869	0.114 (0.261)		0.755
28	2.33	3.50	0.608	0.114 (0.182)		0.494
29	2.42	6.80	1.182	0.114 (0.355)		1.068
30	2.50	7.30	1.269	0.114 (0.381)		1.155
31	2.58	8.20	1.425	0.114 (0.428)		1.311
32	2.67	5.90	1.025	0.114 (0.308)		0.912
33	2.75	2.00	0.348	(0.114)	0.104	0.243
34	2.83	1.80	0.313	(0.114)	0.094	0.219
35	2.92	1.80	0.313	(0.114)	0.094	0.219
36	3.00	0.60	0.104	(0.114)	0.031	0.073

(Loss Rate Not Used)

Sum = 100.0

Sum = 13.8

Flood volume = Effective rainfall 1.15(In)

times area $9.5(\text{Ac.}) / [(\text{In}) / (\text{Ft.})] = \quad 0.9(\text{Ac.Ft})$

$$\text{Total soil loss} = 0.30(I_n)$$

Total soil loss = 0.234(Ac.Ft)

Total rainfall = 1.45(In)

Flood volume = 39644.7 Cubic Feet

Total soil loss = 10193.4 Cubic Feet

Peak flow rate of this hydrograph = 11.511(CFS)

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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	5.0	10.0	15.0	20.0
0+ 5	0.0050	0.73	VQ					
0+10	0.0143	1.35	V Q					
0+15	0.0236	1.36	VQ					
0+20	0.0342	1.53	V Q					
0+25	0.0459	1.70	VQ					
0+30	0.0590	1.90	VQ					
0+35	0.0720	1.89	Q					
0+40	0.0853	1.94	Q					
0+45	0.0996	2.07	Q					
0+50	0.1127	1.92	QV					
0+55	0.1254	1.84	Q V					
1+ 0	0.1390	1.97	Q V					
1+ 5	0.1548	2.29	Q V					
1+10	0.1720	2.51	Q V					
1+15	0.1896	2.55	Q V					
1+20	0.2065	2.45	Q V					
1+25	0.2257	2.79	Q V					
1+30	0.2479	3.22	Q V					
1+35	0.2693	3.11	Q V					
1+40	0.2913	3.19	Q V					
1+45	0.3177	3.84	Q V					
1+50	0.3460	4.11	Q V					
1+55	0.3730	3.91	Q V					
2+ 0	0.3995	3.85	Q V					
2+ 5	0.4268	3.97	Q V					
2+10	0.4607	4.92	Q V					
2+15	0.5043	6.33	Q V					
2+20	0.5444	5.83	Q V					
2+25	0.5967	7.58	Q V					
2+30	0.6662	10.10	Q V					
2+35	0.7455	11.51	Q V					
2+40	0.8179	10.52	Q V					
2+45	0.8593	6.01	Q V					
2+50	0.8800	3.00	Q V					
2+55	0.8958	2.30	Q V					
3+ 0	0.9057	1.43	Q V					
3+ 5	0.9092	0.51	Q V					
3+10	0.9100	0.11	Q V					

3+15

0.9101

0.02 Q

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V

Unit Hydrograph Analysis

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

Program License Serial Number 6387

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

English Units used in output format

PROPOSED

Drainage Area = 9.48(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.48(Ac.) =
0.015 Sq. Mi.
Length along longest watercourse = 1046.00(Ft.)
Length along longest watercourse measured to centroid = 593.00(Ft.)
Length along longest watercourse = 0.198 Mi.
Length along longest watercourse measured to centroid = 0.112 Mi.
Difference in elevation = 17.00(Ft.)
Slope along watercourse = 85.8126 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.036 Hr.
Lag time = 2.18 Min.
25% of lag time = 0.55 Min.
40% of lag time = 0.87 Min.
Unit time = 10.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	1.19	11.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	2.99	28.35

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 1.190(In)
Area Averaged 100-Year Rainfall = 2.990(In)

Point rain (area averaged) = 1.931(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.930(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.480	71.00	0.750

Total Area Entered = 9.48(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
71.0	71.0	0.350	0.750	0.114	1.000	0.114
Sum (F) =						0.114

Area averaged mean soil loss (F) (In/Hr) = 0.114
Minimum soil loss rate ((In/Hr)) = 0.057
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.300

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.167	458.079	68.704	6.564
2 0.333	916.157	31.296	2.990
Sum = 100.000		Sum=	9.554

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.17	1.10	0.127	(0.114)	0.038	0.089
2	0.33	1.20	0.139	(0.114)	0.042	0.097
3	0.50	1.30	0.151	(0.114)	0.045	0.105
4	0.67	1.40	0.162	(0.114)	0.049	0.114
5	0.83	1.40	0.162	(0.114)	0.049	0.114
6	1.00	1.50	0.174	(0.114)	0.052	0.122
7	1.17	1.60	0.185	(0.114)	0.056	0.130
8	1.33	1.60	0.185	(0.114)	0.056	0.130
9	1.50	1.60	0.185	(0.114)	0.056	0.130
10	1.67	1.60	0.185	(0.114)	0.056	0.130
11	1.83	1.60	0.185	(0.114)	0.056	0.130
12	2.00	1.70	0.197	(0.114)	0.059	0.138
13	2.17	1.70	0.197	(0.114)	0.059	0.138
14	2.33	1.80	0.208	(0.114)	0.063	0.146
15	2.50	1.80	0.208	(0.114)	0.063	0.146
16	2.67	1.80	0.208	(0.114)	0.063	0.146
17	2.83	2.00	0.232	(0.114)	0.069	0.162
18	3.00	2.00	0.232	(0.114)	0.069	0.162
19	3.17	2.10	0.243	(0.114)	0.073	0.170
20	3.33	2.20	0.255	(0.114)	0.076	0.178
21	3.50	2.50	0.290	(0.114)	0.087	0.203
22	3.67	2.80	0.324	(0.114)	0.097	0.227
23	3.83	3.00	0.347	(0.114)	0.104	0.243
24	4.00	3.20	0.371	(0.114)	0.111	0.259
25	4.17	3.50	0.405	0.114	(0.122)	0.292
26	4.33	3.90	0.452	0.114	(0.136)	0.338
27	4.50	4.20	0.486	0.114	(0.146)	0.373
28	4.67	4.50	0.521	0.114	(0.156)	0.407
29	4.83	4.80	0.556	0.114	(0.167)	0.442
30	5.00	5.10	0.591	0.114	(0.177)	0.477
31	5.17	6.70	0.776	0.114	(0.233)	0.662
32	5.33	8.10	0.938	0.114	(0.281)	0.824
33	5.50	10.30	1.193	0.114	(0.358)	1.079
34	5.67	2.80	0.324	(0.114)	0.097	0.227
35	5.83	1.10	0.127	(0.114)	0.038	0.089
36	6.00	0.50	0.058	(0.114)	0.017	0.041

(Loss Rate Not Used)

Sum = 100.0

Sum = 8.9

Flood volume = Effective rainfall 1.48(In)
times area 9.5(Ac.)/[(In)/(Ft.)] = 1.2(Ac.Ft)
Total soil loss = 0.45(In)
Total soil loss = 0.359(Ac.Ft)
Total rainfall = 1.93(In)
Flood volume = 50811.6 Cubic Feet
Total soil loss = 15620.6 Cubic Feet

Peak flow rate of this hydrograph = 9.554(CFS)

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

 Hydrograph in 10 Minute intervals ((CFS))

 Time(h+m) Volume Ac.Ft Q(CFS) 0 2.5 5.0 7.5 10.0

0+10	0.0081	0.59	V Q					
0+20	0.0205	0.91	V Q					
0+30	0.0341	0.98	V Q					
0+40	0.0487	1.06	V Q					
0+50	0.0636	1.09	V Q					
1+ 0	0.0793	1.14	V Q					
1+10	0.0961	1.22	VQ					
1+20	0.1132	1.24	VQ					
1+30	0.1302	1.24	Q					
1+40	0.1473	1.24	QV					
1+50	0.1644	1.24	QV					
2+ 0	0.1822	1.29	QV					
2+10	0.2004	1.32	QV					
2+20	0.2192	1.37	Q V					
2+30	0.2385	1.40	Q V					
2+40	0.2577	1.40	Q V					
2+50	0.2784	1.50	Q V					
3+ 0	0.2997	1.55	Q V					
3+10	0.3218	1.60	Q V					
3+20	0.3449	1.68	Q V					
3+30	0.3706	1.86	Q V					
3+40	0.3995	2.10	Q V					
3+50	0.4309	2.28	Q V					
4+ 0	0.4644	2.43	Q V					
4+10	0.5014	2.69	Q V					
4+20	0.5440	3.09	Q V					
4+30	0.5917	3.46	Q V					
4+40	0.6439	3.79	Q V					
4+50	0.7007	4.12	Q V					
5+ 0	0.7620	4.45	Q V					
5+10	0.8416	5.78	Q V					
5+20	0.9434	7.40	Q V					
5+30	1.0750	9.55	Q V					
5+40	1.1400	4.72	Q V					
5+50	1.1575	1.26	Q V					
6+ 0	1.1648	0.53	Q V					
6+10	1.1665	0.12	Q V					

Unit Hydrograph Analysis

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Study date 10/09/20 File: boulders22410.out

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

Program License Serial Number 6387

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

English Units used in output format

PROPOSED

Drainage Area = 9.48(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.48(Ac.) =
0.015 Sq. Mi.
Length along longest watercourse = 1046.00(Ft.)
Length along longest watercourse measured to centroid = 593.00(Ft.)
Length along longest watercourse = 0.198 Mi.
Length along longest watercourse measured to centroid = 0.112 Mi.
Difference in elevation = 17.00(Ft.)
Slope along watercourse = 85.8126 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.036 Hr.
Lag time = 2.18 Min.
25% of lag time = 0.55 Min.
40% of lag time = 0.87 Min.
Unit time = 15.00 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]
9.48	2.03	19.24

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	5.32	50.43

STORM EVENT (YEAR) = 10.00
Area Averaged 2-Year Rainfall = 2.030(In)
Area Averaged 100-Year Rainfall = 5.320(In)

Point rain (area averaged) = 3.384(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.383(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.480	71.00	0.750

Total Area Entered = 9.48(Ac.)

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-2	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
71.0	71.0	0.350	0.750	0.114	1.000	0.114
Sum (F) =						0.114

Area averaged mean soil loss (F) (In/Hr) = 0.114
Minimum soil loss rate ((In/Hr)) = 0.057
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.300

Unit Hydrograph VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	687.118	78.177	7.469
2 0.500	1374.236	21.823	2.085
Sum = 100.000		Sum=	9.554

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.25	0.20	0.027	(0.201)	0.008	0.019
2	0.50	0.30	0.041	(0.199)	0.012	0.028
3	0.75	0.30	0.041	(0.196)	0.012	0.028
4	1.00	0.40	0.054	(0.194)	0.016	0.038
5	1.25	0.30	0.041	(0.192)	0.012	0.028
6	1.50	0.30	0.041	(0.189)	0.012	0.028
7	1.75	0.30	0.041	(0.187)	0.012	0.028
8	2.00	0.40	0.054	(0.185)	0.016	0.038
9	2.25	0.40	0.054	(0.183)	0.016	0.038
10	2.50	0.40	0.054	(0.180)	0.016	0.038
11	2.75	0.50	0.068	(0.178)	0.020	0.047
12	3.00	0.50	0.068	(0.176)	0.020	0.047
13	3.25	0.50	0.068	(0.174)	0.020	0.047
14	3.50	0.50	0.068	(0.172)	0.020	0.047
15	3.75	0.50	0.068	(0.170)	0.020	0.047
16	4.00	0.60	0.081	(0.167)	0.024	0.057
17	4.25	0.60	0.081	(0.165)	0.024	0.057
18	4.50	0.70	0.095	(0.163)	0.028	0.066
19	4.75	0.70	0.095	(0.161)	0.028	0.066
20	5.00	0.80	0.108	(0.159)	0.032	0.076
21	5.25	0.60	0.081	(0.157)	0.024	0.057
22	5.50	0.70	0.095	(0.155)	0.028	0.066
23	5.75	0.80	0.108	(0.153)	0.032	0.076
24	6.00	0.80	0.108	(0.151)	0.032	0.076
25	6.25	0.90	0.122	(0.149)	0.037	0.085
26	6.50	0.90	0.122	(0.147)	0.037	0.085
27	6.75	1.00	0.135	(0.145)	0.041	0.095
28	7.00	1.00	0.135	(0.143)	0.041	0.095
29	7.25	1.00	0.135	(0.141)	0.041	0.095
30	7.50	1.10	0.149	(0.139)	0.045	0.104
31	7.75	1.20	0.162	(0.137)	0.049	0.114
32	8.00	1.30	0.176	(0.135)	0.053	0.123
33	8.25	1.50	0.203	(0.133)	0.061	0.142
34	8.50	1.50	0.203	(0.132)	0.061	0.142
35	8.75	1.60	0.217	(0.130)	0.065	0.152
36	9.00	1.70	0.230	(0.128)	0.069	0.161
37	9.25	1.90	0.257	(0.126)	0.077	0.180
38	9.50	2.00	0.271	(0.124)	0.081	0.189
39	9.75	2.10	0.284	(0.123)	0.085	0.199
40	10.00	2.20	0.298	(0.121)	0.089	0.208
41	10.25	1.50	0.203	(0.119)	0.061	0.142
42	10.50	1.50	0.203	(0.117)	0.061	0.142
43	10.75	2.00	0.271	(0.116)	0.081	0.189
44	11.00	2.00	0.271	(0.114)	0.081	0.189
45	11.25	1.90	0.257	(0.112)	0.077	0.180
46	11.50	1.90	0.257	(0.111)	0.077	0.180
47	11.75	1.70	0.230	(0.109)	0.069	0.161

48	12.00	1.80	0.244	(0.107)	0.073	0.171
49	12.25	2.50	0.338	(0.106)	0.102	0.237
50	12.50	2.60	0.352	0.104	(0.106)	0.248
51	12.75	2.80	0.379	0.103	(0.114)	0.276
52	13.00	2.90	0.392	0.101	(0.118)	0.291
53	13.25	3.40	0.460	0.099	(0.138)	0.361
54	13.50	3.40	0.460	0.098	(0.138)	0.362
55	13.75	2.30	0.311	(0.096)	0.093	0.218
56	14.00	2.30	0.311	(0.095)	0.093	0.218
57	14.25	2.70	0.365	0.094	(0.110)	0.272
58	14.50	2.60	0.352	0.092	(0.106)	0.260
59	14.75	2.60	0.352	0.091	(0.106)	0.261
60	15.00	2.50	0.338	0.089	(0.102)	0.249
61	15.25	2.40	0.325	0.088	(0.097)	0.237
62	15.50	2.30	0.311	0.087	(0.093)	0.225
63	15.75	1.90	0.257	(0.085)	0.077	0.180
64	16.00	1.90	0.257	(0.084)	0.077	0.180
65	16.25	0.40	0.054	(0.083)	0.016	0.038
66	16.50	0.40	0.054	(0.081)	0.016	0.038
67	16.75	0.30	0.041	(0.080)	0.012	0.028
68	17.00	0.30	0.041	(0.079)	0.012	0.028
69	17.25	0.50	0.068	(0.078)	0.020	0.047
70	17.50	0.50	0.068	(0.077)	0.020	0.047
71	17.75	0.50	0.068	(0.076)	0.020	0.047
72	18.00	0.40	0.054	(0.074)	0.016	0.038
73	18.25	0.40	0.054	(0.073)	0.016	0.038
74	18.50	0.40	0.054	(0.072)	0.016	0.038
75	18.75	0.30	0.041	(0.071)	0.012	0.028
76	19.00	0.20	0.027	(0.070)	0.008	0.019
77	19.25	0.30	0.041	(0.069)	0.012	0.028
78	19.50	0.40	0.054	(0.068)	0.016	0.038
79	19.75	0.30	0.041	(0.067)	0.012	0.028
80	20.00	0.20	0.027	(0.066)	0.008	0.019
81	20.25	0.30	0.041	(0.066)	0.012	0.028
82	20.50	0.30	0.041	(0.065)	0.012	0.028
83	20.75	0.30	0.041	(0.064)	0.012	0.028
84	21.00	0.20	0.027	(0.063)	0.008	0.019
85	21.25	0.30	0.041	(0.062)	0.012	0.028
86	21.50	0.20	0.027	(0.062)	0.008	0.019
87	21.75	0.30	0.041	(0.061)	0.012	0.028
88	22.00	0.20	0.027	(0.060)	0.008	0.019
89	22.25	0.30	0.041	(0.060)	0.012	0.028
90	22.50	0.20	0.027	(0.059)	0.008	0.019
91	22.75	0.20	0.027	(0.059)	0.008	0.019
92	23.00	0.20	0.027	(0.058)	0.008	0.019
93	23.25	0.20	0.027	(0.058)	0.008	0.019
94	23.50	0.20	0.027	(0.057)	0.008	0.019
95	23.75	0.20	0.027	(0.057)	0.008	0.019
96	24.00	0.20	0.027	(0.057)	0.008	0.019

(Loss Rate Not Used)

Sum = 100.0 Sum = 9.7

Flood volume = Effective rainfall 2.41(In)
times area 9.5(Ac.)/[(In)/(Ft.)] = 1.9(Ac.Ft)
Total soil loss = 0.97(In)
Total soil loss = 0.766(Ac.Ft)
Total rainfall = 3.38(In)
Flood volume = 83056.6 Cubic Feet
Total soil loss = 33376.7 Cubic Feet

Peak flow rate of this hydrograph = 3.459(CFS)

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

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0029	0.14	Q					
0+30	0.0081	0.25	VQ					
0+45	0.0137	0.27	VQ					
1+ 0	0.0208	0.34	VQ					
1+15	0.0268	0.29	VQ					
1+30	0.0325	0.27	VQ					
1+45	0.0381	0.27	VQ					
2+ 0	0.0451	0.34	VQ					
2+15	0.0526	0.36	Q					
2+30	0.0601	0.36	Q					
2+45	0.0691	0.43	Q					
3+ 0	0.0784	0.45	Q					
3+15	0.0878	0.45	Q					
3+30	0.0971	0.45	QV					
3+45	0.1065	0.45	QV					
4+ 0	0.1173	0.52	Q					
4+15	0.1285	0.54	Q					
4+30	0.1412	0.61	Q					
4+45	0.1543	0.63	QV					
5+ 0	0.1689	0.70	QV					
5+15	0.1809	0.58	QV					
5+30	0.1936	0.61	Q V					
5+45	0.2082	0.70	Q V					
6+ 0	0.2231	0.72	Q V					
6+15	0.2396	0.80	Q V					
6+30	0.2564	0.82	Q V					
6+45	0.2747	0.89	Q V					
7+ 0	0.2934	0.91	Q V					
7+15	0.3121	0.91	Q V					
7+30	0.3323	0.98	Q V					

7+45	0.3543	1.07	Q	V					
8+ 0	0.3783	1.16	Q	V					
8+15	0.4055	1.32	Q	V					
8+30	0.4336	1.36	Q	V					
8+45	0.4631	1.43	Q	V					
9+ 0	0.4945	1.52	Q	V					
9+15	0.5292	1.68	Q	V					
9+30	0.5662	1.79	Q	V					
9+45	0.6051	1.88	Q	V					
10+ 0	0.6459	1.97	Q	V					
10+15	0.6768	1.50	Q	V					
10+30	0.7049	1.36	Q	V					
10+45	0.7403	1.71	Q	V					
11+ 0	0.7777	1.81	Q	V					
11+15	0.8136	1.74	Q	V					
11+30	0.8492	1.72	Q	V					
11+45	0.8818	1.58	Q	V					
12+ 0	0.9151	1.61	Q	V					
12+15	0.9590	2.13	Q	V					
12+30	1.0075	2.35	Q	V					
12+45	1.0608	2.58	Q	V					
13+ 0	1.1177	2.75	Q	V					
13+15	1.1860	3.30	Q	V					
13+30	1.2574	3.46	Q	V					
13+45	1.3067	2.38	Q	V					
14+ 0	1.3497	2.08	Q	V					
14+15	1.4011	2.49	Q	V					
14+30	1.4529	2.51	Q	V					
14+45	1.5044	2.49	Q	V					
15+ 0	1.5541	2.41	Q	V					
15+15	1.6014	2.29	Q	V					
15+30	1.6463	2.17	Q	V					
15+45	1.6838	1.81	Q	V					
16+ 0	1.7193	1.72	Q	V					
16+15	1.7329	0.66	Q	V					
16+30	1.7404	0.36	Q	V					
16+45	1.7465	0.29	Q	V					
17+ 0	1.7521	0.27	Q	V					
17+15	1.7606	0.41	Q	V					
17+30	1.7700	0.45	Q	V					
17+45	1.7793	0.45	Q	V					
18+ 0	1.7872	0.38	Q	V					
18+15	1.7947	0.36	Q	V					
18+30	1.8022	0.36	Q	V					
18+45	1.8082	0.29	Q	V					
19+ 0	1.8123	0.20	Q	V					
19+15	1.8176	0.25	Q	V					
19+30	1.8246	0.34	Q	V					
19+45	1.8306	0.29	Q	V					
20+ 0	1.8348	0.20	Q	V					

20+15	1.8400	0.25	Q				V
20+30	1.8456	0.27	Q				V
20+45	1.8512	0.27	Q				V
21+ 0	1.8554	0.20	Q				V
21+15	1.8606	0.25	Q				V
21+30	1.8647	0.20	Q				V
21+45	1.8699	0.25	Q				V
22+ 0	1.8741	0.20	Q				V
22+15	1.8793	0.25	Q				V
22+30	1.8834	0.20	Q				V
22+45	1.8872	0.18	Q				V
23+ 0	1.8909	0.18	Q				V
23+15	1.8947	0.18	Q				V
23+30	1.8984	0.18	Q				V
23+45	1.9022	0.18	Q				V
24+ 0	1.9059	0.18	Q				V
24+15	1.9067	0.04	Q				V

Unit Hydrograph Analysis

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Study date 10/09/20 File: boulders23100.out

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

Program License Serial Number 6387

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

English Units used in output format

PROPOSED

Drainage Area = 9.48(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.48(Ac.) =
0.015 Sq. Mi.
Length along longest watercourse = 1046.00(Ft.)
Length along longest watercourse measured to centroid = 593.00(Ft.)
Length along longest watercourse = 0.198 Mi.
Length along longest watercourse measured to centroid = 0.112 Mi.
Difference in elevation = 17.00(Ft.)
Slope along watercourse = 85.8126 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.036 Hr.
Lag time = 2.18 Min.
25% of lag time = 0.55 Min.
40% of lag time = 0.87 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]
9.48	0.87	8.22

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	2.28	21.61

STORM EVENT (YEAR) = 100.00

Area Averaged 2-Year Rainfall = 0.867(In)

Area Averaged 100-Year Rainfall = 2.280(In)

Point rain (area averaged) = 2.280(In)

Areal adjustment factor = 100.00 %

Adjusted average point rain = 2.280(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.480	71.00	0.750
Total Area Entered = 9.48(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
71.0	85.6	0.180	0.750	0.059	1.000	0.059
Sum (F) =						0.059

Area averaged mean soil loss (F) (In/Hr) = 0.059

Minimum soil loss rate ((In/Hr)) = 0.029

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.300

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.083	229.039	48.008	4.587
2 0.167	458.079	41.392	3.955
3 0.250	687.118	7.724	0.738
4 0.333	916.157	2.876	0.275
Sum = 100.000		Sum=	9.554

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.08	1.30	0.356	0.059	(0.107)	0.297
2	0.17	1.30	0.356	0.059	(0.107)	0.297
3	0.25	1.10	0.301	0.059	(0.090)	0.242
4	0.33	1.50	0.410	0.059	(0.123)	0.352
5	0.42	1.50	0.410	0.059	(0.123)	0.352
6	0.50	1.80	0.492	0.059	(0.148)	0.434
7	0.58	1.50	0.410	0.059	(0.123)	0.352
8	0.67	1.80	0.492	0.059	(0.148)	0.434
9	0.75	1.80	0.492	0.059	(0.148)	0.434
10	0.83	1.50	0.410	0.059	(0.123)	0.352
11	0.92	1.60	0.438	0.059	(0.131)	0.379
12	1.00	1.80	0.492	0.059	(0.148)	0.434
13	1.08	2.20	0.602	0.059	(0.181)	0.543
14	1.17	2.20	0.602	0.059	(0.181)	0.543
15	1.25	2.20	0.602	0.059	(0.181)	0.543
16	1.33	2.00	0.547	0.059	(0.164)	0.489
17	1.42	2.60	0.711	0.059	(0.213)	0.653
18	1.50	2.70	0.739	0.059	(0.222)	0.680
19	1.58	2.40	0.657	0.059	(0.197)	0.598
20	1.67	2.70	0.739	0.059	(0.222)	0.680
21	1.75	3.30	0.903	0.059	(0.271)	0.844
22	1.83	3.10	0.848	0.059	(0.254)	0.790
23	1.92	2.90	0.793	0.059	(0.238)	0.735
24	2.00	3.00	0.821	0.059	(0.246)	0.762
25	2.08	3.10	0.848	0.059	(0.254)	0.790
26	2.17	4.20	1.149	0.059	(0.345)	1.091
27	2.25	5.00	1.368	0.059	(0.410)	1.309
28	2.33	3.50	0.958	0.059	(0.287)	0.899
29	2.42	6.80	1.860	0.059	(0.558)	1.802
30	2.50	7.30	1.997	0.059	(0.599)	1.939
31	2.58	8.20	2.243	0.059	(0.673)	2.185
32	2.67	5.90	1.614	0.059	(0.484)	1.556
33	2.75	2.00	0.547	0.059	(0.164)	0.489
34	2.83	1.80	0.492	0.059	(0.148)	0.434
35	2.92	1.80	0.492	0.059	(0.148)	0.434
36	3.00	0.60	0.164	(0.059)	0.049	0.115

(Loss Rate Not Used)

Sum = 100.0

Sum = 25.3

Flood volume = Effective rainfall 2.11(In)

times area 9.5(Ac.)/[(In)/(Ft.)] = 1.7(Ac.Ft)

Total soil loss = 0.17(In)

Total soil loss = 0.138(Ac.Ft)

Total rainfall = 2.28(In)

Flood volume = 72439.0 Cubic Feet

Total soil loss = 6018.1 Cubic Feet

Peak flow rate of this hydrograph = 19.275(CFS)

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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 5.0 10.0 15.0 20.0

0+ 5	0.0094	1.36	V Q					
0+10	0.0269	2.54	V Q					
0+15	0.0441	2.51	V Q					
0+20	0.0639	2.87	V Q					
0+25	0.0864	3.27	V Q					
0+30	0.1120	3.71	V Q					
0+35	0.1374	3.69	V Q					
0+40	0.1636	3.80	V Q					
0+45	0.1917	4.09	V Q					
0+50	0.2175	3.75	V Q					
0+55	0.2421	3.57	V Q					
1+ 0	0.2688	3.87	VQ					
1+ 5	0.3004	4.59	V Q					
1+10	0.3353	5.07	V Q					
1+15	0.3708	5.16	V Q					
1+20	0.4049	4.94	Q					
1+25	0.4426	5.48	Q					
1+30	0.4854	6.21	VQ					
1+35	0.5271	6.05	Q					
1+40	0.5696	6.17	QV					
1+45	0.6191	7.19	Q					
1+50	0.6717	7.63	QV					
1+55	0.7220	7.31	Q V					
2+ 0	0.7717	7.22	Q V					
2+ 5	0.8227	7.40	Q V					
2+10	0.8839	8.89	Q					
2+15	0.9605	11.12						
2+20	1.0316	10.33						
2+25	1.1218	13.09						
2+30	1.2392	17.05						
2+35	1.3720	19.27						
2+40	1.4939	17.71						
2+45	1.5666	10.54						
2+50	1.6056	5.67						
2+55	1.6366	4.50						
3+ 0	1.6552	2.70						
3+ 5	1.6613	0.89						
3+10	1.6628	0.20						

3+15

1.6630

0.03 Q

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Unit Hydrograph Analysis

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Study date 10/09/20 File: boulders26100.out

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

Program License Serial Number 6387

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

English Units used in output format

PROPOSED

Drainage Area = 9.48(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.48(Ac.) =
0.015 Sq. Mi.
Length along longest watercourse = 1046.00(Ft.)
Length along longest watercourse measured to centroid = 593.00(Ft.)
Length along longest watercourse = 0.198 Mi.
Length along longest watercourse measured to centroid = 0.112 Mi.
Difference in elevation = 17.00(Ft.)
Slope along watercourse = 85.8126 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.036 Hr.
Lag time = 2.18 Min.
25% of lag time = 0.55 Min.
40% of lag time = 0.87 Min.
Unit time = 10.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	1.19	11.28

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	2.99	28.35

STORM EVENT (YEAR) = 100.00

Area Averaged 2-Year Rainfall = 1.190(In)

Area Averaged 100-Year Rainfall = 2.990(In)

Point rain (area averaged) = 2.990(In)

Areal adjustment factor = 100.00 %

Adjusted average point rain = 2.990(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.480	71.00	0.750
Total Area Entered = 9.48(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
71.0	85.6	0.180	0.750	0.059	1.000	0.059
Sum (F) =						0.059

Area averaged mean soil loss (F) (In/Hr) = 0.059

Minimum soil loss rate ((In/Hr)) = 0.029

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.300

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.167	458.079	68.704	6.564
2 0.333	916.157	31.296	2.990
Sum = 100.000		Sum=	9.554

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.17	1.10	0.197	0.059	(0.059)	0.139
2	0.33	1.20	0.215	0.059	(0.065)	0.157
3	0.50	1.30	0.233	0.059	(0.070)	0.175
4	0.67	1.40	0.251	0.059	(0.075)	0.193
5	0.83	1.40	0.251	0.059	(0.075)	0.193
6	1.00	1.50	0.269	0.059	(0.081)	0.211
7	1.17	1.60	0.287	0.059	(0.086)	0.228
8	1.33	1.60	0.287	0.059	(0.086)	0.228
9	1.50	1.60	0.287	0.059	(0.086)	0.228
10	1.67	1.60	0.287	0.059	(0.086)	0.228
11	1.83	1.60	0.287	0.059	(0.086)	0.228
12	2.00	1.70	0.305	0.059	(0.091)	0.246
13	2.17	1.70	0.305	0.059	(0.091)	0.246
14	2.33	1.80	0.323	0.059	(0.097)	0.264
15	2.50	1.80	0.323	0.059	(0.097)	0.264
16	2.67	1.80	0.323	0.059	(0.097)	0.264
17	2.83	2.00	0.359	0.059	(0.108)	0.300
18	3.00	2.00	0.359	0.059	(0.108)	0.300
19	3.17	2.10	0.377	0.059	(0.113)	0.318
20	3.33	2.20	0.395	0.059	(0.118)	0.336
21	3.50	2.50	0.448	0.059	(0.135)	0.390
22	3.67	2.80	0.502	0.059	(0.151)	0.444
23	3.83	3.00	0.538	0.059	(0.161)	0.480
24	4.00	3.20	0.574	0.059	(0.172)	0.516
25	4.17	3.50	0.628	0.059	(0.188)	0.569
26	4.33	3.90	0.700	0.059	(0.210)	0.641
27	4.50	4.20	0.753	0.059	(0.226)	0.695
28	4.67	4.50	0.807	0.059	(0.242)	0.749
29	4.83	4.80	0.861	0.059	(0.258)	0.803
30	5.00	5.10	0.915	0.059	(0.274)	0.856
31	5.17	6.70	1.202	0.059	(0.361)	1.143
32	5.33	8.10	1.453	0.059	(0.436)	1.395
33	5.50	10.30	1.848	0.059	(0.554)	1.789
34	5.67	2.80	0.502	0.059	(0.151)	0.444
35	5.83	1.10	0.197	0.059	(0.059)	0.139
36	6.00	0.50	0.090	(0.059)	0.027	0.063

(Loss Rate Not Used)

Sum = 100.0

Sum = 15.9

Flood volume = Effective rainfall 2.64(In)
times area 9.5(Ac.)/[(In)/(Ft.)] = 2.1(Ac.Ft)
Total soil loss = 0.35(In)
Total soil loss = 0.273(Ac.Ft)
Total rainfall = 2.99(In)
Flood volume = 90981.7 Cubic Feet
Total soil loss = 11908.0 Cubic Feet

Peak flow rate of this hydrograph = 15.922(CFS)

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

Hydrograph in 10 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+10	0.0126	0.91	VQ					
0+20	0.0324	1.44	V Q					
0+30	0.0547	1.62	V Q					
0+40	0.0793	1.79	V Q					
0+50	0.1047	1.84	VQ					
1+ 0	0.1317	1.96	VQ					
1+10	0.1610	2.13	VQ					
1+20	0.1911	2.18	VQ					
1+30	0.2212	2.18	Q					
1+40	0.2513	2.18	Q					
1+50	0.2813	2.18	QV					
2+ 0	0.3130	2.30	QV					
2+10	0.3455	2.36	Q V					
2+20	0.3796	2.47	Q V					
2+30	0.4144	2.53	Q V					
2+40	0.4492	2.53	Q V					
2+50	0.4872	2.76	Q V					
3+ 0	0.5268	2.87	Q V					
3+10	0.5679	2.99	Q V					
3+20	0.6114	3.16	Q V					
3+30	0.6606	3.57	Q V					
3+40	0.7168	4.08	Q V					
3+50	0.7784	4.48	Q V					
4+ 0	0.8448	4.82	Q V					
4+10	0.9176	5.28	Q V					
4+20	0.9990	5.91	Q V					
4+30	1.0883	6.48	Q V					
4+40	1.1847	7.00	Q V					
4+50	1.2881	7.51	Q V					
5+ 0	1.3987	8.02	Q V					
5+10	1.5374	10.07	Q V					
5+20	1.7106	12.58	Q V					
5+30	1.9300	15.92	Q V					
5+40	2.0438	8.27	Q					V
5+50	2.0747	2.24	Q					V
6+ 0	2.0861	0.83	Q					V
6+10	2.0887	0.19	Q					V

Unit Hydrograph Analysis

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Study date 10/09/20 File: boulders224100.out

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

Program License Serial Number 6387

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

English Units used in output format

PROPOSED

Drainage Area = 9.48(Ac.) = 0.015 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 9.48(Ac.) =
0.015 Sq. Mi.
Length along longest watercourse = 1046.00(Ft.)
Length along longest watercourse measured to centroid = 593.00(Ft.)
Length along longest watercourse = 0.198 Mi.
Length along longest watercourse measured to centroid = 0.112 Mi.
Difference in elevation = 17.00(Ft.)
Slope along watercourse = 85.8126 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.036 Hr.
Lag time = 2.18 Min.
25% of lag time = 0.55 Min.
40% of lag time = 0.87 Min.
Unit time = 15.00 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]
9.48	2.03	19.24

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
9.48	5.32	50.43

STORM EVENT (YEAR) = 100.00

Area Averaged 2-Year Rainfall = 2.030(In)

Area Averaged 100-Year Rainfall = 5.320(In)

Point rain (area averaged) = 5.320(In)

Areal adjustment factor = 100.00 %

Adjusted average point rain = 5.320(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
9.480	71.00	0.750
Total Area Entered = 9.48(Ac.)		

RI	RI	Infil. Rate	Impervious	Adj. Infil. Rate	Area%	F
AMC2	AMC-3	(In/Hr)	(Dec.%)	(In/Hr)	(Dec.)	(In/Hr)
71.0	85.6	0.180	0.750	0.059	1.000	0.059
Sum (F) =						0.059

Area averaged mean soil loss (F) (In/Hr) = 0.059

Minimum soil loss rate ((In/Hr)) = 0.029

(for 24 hour storm duration)

Soil low loss rate (decimal) = 0.300

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

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag	Distribution Graph %	Unit Hydrograph (CFS)
1 0.250	687.118	78.177	7.469
2 0.500	1374.236	21.823	2.085
Sum = 100.000		Sum=	9.554

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

Unit	Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr)		Effective (In/Hr)
				Max	Low	
1	0.25	0.20	0.043	(0.103)	0.013	0.030
2	0.50	0.30	0.064	(0.102)	0.019	0.045
3	0.75	0.30	0.064	(0.101)	0.019	0.045
4	1.00	0.40	0.085	(0.100)	0.026	0.060
5	1.25	0.30	0.064	(0.099)	0.019	0.045
6	1.50	0.30	0.064	(0.097)	0.019	0.045
7	1.75	0.30	0.064	(0.096)	0.019	0.045
8	2.00	0.40	0.085	(0.095)	0.026	0.060
9	2.25	0.40	0.085	(0.094)	0.026	0.060
10	2.50	0.40	0.085	(0.093)	0.026	0.060
11	2.75	0.50	0.106	(0.092)	0.032	0.074
12	3.00	0.50	0.106	(0.091)	0.032	0.074
13	3.25	0.50	0.106	(0.089)	0.032	0.074
14	3.50	0.50	0.106	(0.088)	0.032	0.074
15	3.75	0.50	0.106	(0.087)	0.032	0.074
16	4.00	0.60	0.128	(0.086)	0.038	0.089
17	4.25	0.60	0.128	(0.085)	0.038	0.089
18	4.50	0.70	0.149	(0.084)	0.045	0.104
19	4.75	0.70	0.149	(0.083)	0.045	0.104
20	5.00	0.80	0.170	(0.082)	0.051	0.119
21	5.25	0.60	0.128	(0.081)	0.038	0.089
22	5.50	0.70	0.149	(0.080)	0.045	0.104
23	5.75	0.80	0.170	(0.079)	0.051	0.119
24	6.00	0.80	0.170	(0.078)	0.051	0.119
25	6.25	0.90	0.192	(0.077)	0.057	0.134
26	6.50	0.90	0.192	(0.076)	0.057	0.134
27	6.75	1.00	0.213	(0.075)	0.064	0.149
28	7.00	1.00	0.213	(0.074)	0.064	0.149
29	7.25	1.00	0.213	(0.073)	0.064	0.149
30	7.50	1.10	0.234	(0.072)	0.070	0.164
31	7.75	1.20	0.255	0.071	(0.077)	0.185
32	8.00	1.30	0.277	0.070	(0.083)	0.207
33	8.25	1.50	0.319	0.069	(0.096)	0.251
34	8.50	1.50	0.319	0.068	(0.096)	0.251
35	8.75	1.60	0.340	0.067	(0.102)	0.274
36	9.00	1.70	0.362	0.066	(0.109)	0.296
37	9.25	1.90	0.404	0.065	(0.121)	0.339
38	9.50	2.00	0.426	0.064	(0.128)	0.362
39	9.75	2.10	0.447	0.063	(0.134)	0.384
40	10.00	2.20	0.468	0.062	(0.140)	0.406
41	10.25	1.50	0.319	0.061	(0.096)	0.258
42	10.50	1.50	0.319	0.060	(0.096)	0.259
43	10.75	2.00	0.426	0.059	(0.128)	0.366
44	11.00	2.00	0.426	0.059	(0.128)	0.367
45	11.25	1.90	0.404	0.058	(0.121)	0.347
46	11.50	1.90	0.404	0.057	(0.121)	0.347
47	11.75	1.70	0.362	0.056	(0.109)	0.306

48	12.00	1.80	0.383	0.055	(0.115)	0.328
49	12.25	2.50	0.532	0.054	(0.160)	0.478
50	12.50	2.60	0.553	0.054	(0.166)	0.500
51	12.75	2.80	0.596	0.053	(0.179)	0.543
52	13.00	2.90	0.617	0.052	(0.185)	0.565
53	13.25	3.40	0.724	0.051	(0.217)	0.672
54	13.50	3.40	0.724	0.050	(0.217)	0.673
55	13.75	2.30	0.489	0.050	(0.147)	0.440
56	14.00	2.30	0.489	0.049	(0.147)	0.441
57	14.25	2.70	0.575	0.048	(0.172)	0.526
58	14.50	2.60	0.553	0.047	(0.166)	0.506
59	14.75	2.60	0.553	0.047	(0.166)	0.507
60	15.00	2.50	0.532	0.046	(0.160)	0.486
61	15.25	2.40	0.511	0.045	(0.153)	0.465
62	15.50	2.30	0.489	0.045	(0.147)	0.445
63	15.75	1.90	0.404	0.044	(0.121)	0.360
64	16.00	1.90	0.404	0.043	(0.121)	0.361
65	16.25	0.40	0.085	(0.043)	0.026	0.060
66	16.50	0.40	0.085	(0.042)	0.026	0.060
67	16.75	0.30	0.064	(0.041)	0.019	0.045
68	17.00	0.30	0.064	(0.041)	0.019	0.045
69	17.25	0.50	0.106	(0.040)	0.032	0.074
70	17.50	0.50	0.106	(0.039)	0.032	0.074
71	17.75	0.50	0.106	(0.039)	0.032	0.074
72	18.00	0.40	0.085	(0.038)	0.026	0.060
73	18.25	0.40	0.085	(0.038)	0.026	0.060
74	18.50	0.40	0.085	(0.037)	0.026	0.060
75	18.75	0.30	0.064	(0.037)	0.019	0.045
76	19.00	0.20	0.043	(0.036)	0.013	0.030
77	19.25	0.30	0.064	(0.036)	0.019	0.045
78	19.50	0.40	0.085	(0.035)	0.026	0.060
79	19.75	0.30	0.064	(0.035)	0.019	0.045
80	20.00	0.20	0.043	(0.034)	0.013	0.030
81	20.25	0.30	0.064	(0.034)	0.019	0.045
82	20.50	0.30	0.064	(0.033)	0.019	0.045
83	20.75	0.30	0.064	(0.033)	0.019	0.045
84	21.00	0.20	0.043	(0.032)	0.013	0.030
85	21.25	0.30	0.064	(0.032)	0.019	0.045
86	21.50	0.20	0.043	(0.032)	0.013	0.030
87	21.75	0.30	0.064	(0.031)	0.019	0.045
88	22.00	0.20	0.043	(0.031)	0.013	0.030
89	22.25	0.30	0.064	(0.031)	0.019	0.045
90	22.50	0.20	0.043	(0.030)	0.013	0.030
91	22.75	0.20	0.043	(0.030)	0.013	0.030
92	23.00	0.20	0.043	(0.030)	0.013	0.030
93	23.25	0.20	0.043	(0.030)	0.013	0.030
94	23.50	0.20	0.043	(0.030)	0.013	0.030
95	23.75	0.20	0.043	(0.029)	0.013	0.030
96	24.00	0.20	0.043	(0.029)	0.013	0.030

(Loss Rate Not Used)

Sum = 100.0 Sum = 17.6

Flood volume = Effective rainfall 4.40(In)
times area 9.5(Ac.)/[(In)/(Ft.)] = 3.5(Ac.Ft)

Total soil loss = 0.92(In)
Total soil loss = 0.725(Ac.Ft)
Total rainfall = 5.32(In)
Flood volume = 151510.1 Cubic Feet
Total soil loss = 31560.4 Cubic Feet

Peak flow rate of this hydrograph = 6.433(CFS)

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

Hydrograph in 15 Minute intervals ((CFS))

Time(h+m)	Volume	Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+15	0.0046	0.22	Q					
0+30	0.0128	0.40	VQ					
0+45	0.0216	0.43	VQ					
1+ 0	0.0327	0.54	V Q					
1+15	0.0422	0.46	VQ					
1+30	0.0510	0.43	VQ					
1+45	0.0599	0.43	VQ					
2+ 0	0.0710	0.54	V Q					
2+15	0.0827	0.57	V Q					
2+30	0.0945	0.57	VQ					
2+45	0.1086	0.68	VQ					
3+ 0	0.1233	0.71	VQ					
3+15	0.1380	0.71	VQ					
3+30	0.1527	0.71	VQ					
3+45	0.1674	0.71	VQ					
4+ 0	0.1844	0.82	VQ					
4+15	0.2021	0.85	VQ					
4+30	0.2220	0.97	VQ					
4+45	0.2426	1.00	VQ					
5+ 0	0.2655	1.11	VQ					
5+15	0.2845	0.92	Q					
5+30	0.3044	0.97	Q					
5+45	0.3273	1.11	VQ					
6+ 0	0.3508	1.14	Q					
6+15	0.3767	1.25	VQ					
6+30	0.4031	1.28	VQ					
6+45	0.4319	1.39	VQ					
7+ 0	0.4613	1.42	Q					
7+15	0.4908	1.42	Q					
7+30	0.5225	1.54	Q					

7+45	0.5581	1.72		Q					
8+ 0	0.5980	1.93		VQ					
8+15	0.6456	2.30		V Q					
8+30	0.6952	2.40		V Q					
8+45	0.7483	2.57		V Q					
9+ 0	0.8058	2.78		V Q					
9+15	0.8710	3.15		V Q					
9+30	0.9415	3.41		V Q					
9+45	1.0163	3.62		V Q					
10+ 0	1.0955	3.83		V Q					
10+15	1.1529	2.77		Q V					
10+30	1.2040	2.47		Q V					
10+45	1.2716	3.28		Q V					
11+ 0	1.3441	3.51		Q V					
11+15	1.4134	3.36		Q V					
11+30	1.4820	3.32		Q V					
11+45	1.5442	3.01		Q V					
12+ 0	1.6080	3.09		Q V					
12+15	1.6958	4.25		Q V					
12+30	1.7936	4.73		Q V					
12+45	1.8990	5.10		Q V					
13+ 0	2.0096	5.36		Q V					
13+15	2.1378	6.20		Q V					
13+30	2.2707	6.43		Q V					
13+45	2.3676	4.69		Q V					
14+ 0	2.4546	4.21		Q V					
14+15	2.5548	4.85		Q V					
14+30	2.6556	4.88		Q V					
14+45	2.7557	4.84		Q V					
15+ 0	2.8525	4.69		Q V					
15+15	2.9454	4.49		Q V					
15+30	3.0341	4.30		Q V					
15+45	3.1089	3.62		Q V					
16+ 0	3.1802	3.45		Q V					
16+15	3.2050	1.20	Q						
16+30	3.2167	0.57	Q						
16+45	3.2262	0.46	Q						
17+ 0	3.2350	0.43	Q						
17+15	3.2485	0.65	Q						
17+30	3.2632	0.71	Q						
17+45	3.2779	0.71	Q						
18+ 0	3.2903	0.60	Q						
18+15	3.3021	0.57	Q						
18+30	3.3138	0.57	Q						
18+45	3.3233	0.46	Q						
19+ 0	3.3298	0.32	Q						
19+15	3.3380	0.40	Q						
19+30	3.3491	0.54	Q						
19+45	3.3586	0.46	Q						
20+ 0	3.3651	0.32	Q						

20+15	3.3733	0.40	Q				V
20+30	3.3821	0.43	Q				V
20+45	3.3910	0.43	Q				V
21+ 0	3.3975	0.32	Q				V
21+15	3.4057	0.40	Q				V
21+30	3.4122	0.32	Q				V
21+45	3.4204	0.40	Q				V
22+ 0	3.4269	0.32	Q				V
22+15	3.4351	0.40	Q				V
22+30	3.4416	0.32	Q				V
22+45	3.4475	0.28	Q				V
23+ 0	3.4534	0.28	Q				V
23+15	3.4593	0.28	Q				V
23+30	3.4651	0.28	Q				V
23+45	3.4710	0.28	Q				V
24+ 0	3.4769	0.28	Q				V
24+15	3.4782	0.06	Q				V

FLOOD HYDROGRAPH ROUTING PROGRAM
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Study date: 10/22/20

ROUTED 3 HOUR 10 YEAR STORM

Program License Serial Number 6387

***** HYDROGRAPH INFORMATION *****

From study/file name: boulders2310.rte
*****HYDROGRAPH DATA*****
Number of intervals = 39
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 11.511 (CFS)
Total volume = 0.910 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 39
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)

Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.016	0.001	0.016	0.016
1.000	0.046	0.001	0.046	0.046
1.500	0.082	0.001	0.082	0.082
2.000	0.125	0.001	0.125	0.125
2.500	0.171	0.001	0.171	0.171
3.000	0.221	0.001	0.221	0.221
3.500	0.273	0.001	0.273	0.273
4.000	0.327	0.001	0.327	0.327
4.500	0.382	0.001	0.382	0.382
5.000	0.438	0.001	0.438	0.438
5.500	0.494	0.000	0.494	0.494
6.000	0.549	3.200	0.538	0.560
6.500	0.603	6.330	0.581	0.625
7.000	0.655	7.980	0.628	0.682
7.500	0.705	9.640	0.672	0.738
8.000	0.751	11.040	0.713	0.789
8.500	0.794	12.280	0.752	0.836
9.000	0.831	13.400	0.785	0.877
9.500	0.860	14.430	0.810	0.910

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	2.9	5.76	8.63	11.51	Depth (Ft.)
0.083	0.73	0.00	0.002	0	I				0.08
0.167	1.35	0.00	0.010	0	I				0.30
0.250	1.36	0.00	0.019	0	I				0.55
0.333	1.53	0.00	0.029	0	I				0.71
0.417	1.70	0.00	0.040	0	I				0.90
0.500	1.90	0.00	0.052	0	I				1.09
0.583	1.89	0.00	0.065	0	I				1.27
0.667	1.94	0.00	0.079	0	I				1.45
0.750	2.07	0.00	0.092	0	I				1.62
0.833	1.92	0.00	0.106	0	I				1.78
0.917	1.84	0.00	0.119	0	I				1.93
1.000	1.97	0.00	0.132	0	I				2.08
1.083	2.29	0.00	0.147	0	I				2.24
1.167	2.51	0.00	0.163	0	I				2.42
1.250	2.55	0.00	0.181	0	I				2.60

1.333	2.45	0.00	0.198	0	I							2.77
1.417	2.79	0.00	0.216	0	I							2.95
1.500	3.22	0.00	0.237	0	I							3.15
1.583	3.11	0.00	0.258	0	I							3.36
1.667	3.19	0.00	0.280	0	I							3.57
1.750	3.84	0.00	0.304	0		I						3.79
1.833	4.11	0.00	0.332	0		I						4.04
1.917	3.91	0.00	0.359	0		I						4.29
2.000	3.85	0.00	0.386	0		I						4.54
2.083	3.97	0.00	0.413	0		I						4.78
2.167	4.92	0.00	0.444	0			I					5.05
2.250	6.33	0.00	0.482	0				I				5.40
2.333	5.83	1.46	0.519		0			I				5.73
2.417	7.58	3.21	0.549			0			I			6.00
2.500	10.10	5.09	0.582				0			I		6.30
2.583	11.51	6.72	0.615					0			I	6.62
2.667	10.52	7.57	0.642						0		I	6.87
2.750	6.01	7.70	0.646					I	0			6.92
2.833	3.00	7.07	0.626			I			0			6.73
2.917	2.30	6.11	0.599		I			0				6.47
3.000	1.43	4.70	0.575		I		0					6.24
3.083	0.51	3.46	0.553	I		0						6.04
3.167	0.11	2.41	0.535	I		0						5.88
3.250	0.02	1.63	0.522	I	0							5.75
3.333	0.00	1.09	0.513	I	0							5.67
3.417	0.00	0.72	0.506	I	0							5.61
3.500	0.00	0.48	0.502	I	0							5.58
3.583	0.00	0.32	0.500	0								5.55
3.667	0.00	0.21	0.498	0								5.53
3.750	0.00	0.14	0.496	0								5.52
3.833	0.00	0.10	0.496	0								5.51
3.917	0.00	0.06	0.495	0								5.51
4.000	0.00	0.04	0.495	0								5.51
4.083	0.00	0.03	0.494	0								5.50
4.167	0.00	0.02	0.494	0								5.50
4.250	0.00	0.01	0.494	0								5.50
4.333	0.00	0.01	0.494	0								5.50
4.417	0.00	0.01	0.494	0								5.50
4.500	0.00	0.00	0.494	0								5.50
4.583	0.00	0.00	0.494	0								5.50
4.667	0.00	0.00	0.494	0								5.50
4.750	0.00	0.00	0.494	0								5.50
4.833	0.00	0.00	0.494	0								5.50

Remaining water in basin = 0.49 (Ac.Ft)

*****HYDROGRAPH DATA*****

Number of intervals = 58

Time interval = 5.0 (Min.)
 Maximum/Peak flow rate = 7.704 (CFS)
 Total volume = 0.416 (Ac.Ft)
 Status of hydrographs being held in storage
 Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
 Peak (CFS) 0.000 0.000 0.000 0.000 0.000
 Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

++++++
 Process from Point/Station 1.000 to Point/Station 2.000
 **** PRINT CURRENT HYDROGRAPH ****

++++++
 P R I N T O F 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	1.9	3.9	5.8	7.7
0+ 5	0.0000	0.00	Q				
0+10	0.0000	0.00	Q				
0+15	0.0000	0.00	Q				
0+20	0.0000	0.00	Q				
0+25	0.0000	0.00	Q				
0+30	0.0000	0.00	Q				
0+35	0.0000	0.00	Q				
0+40	0.0000	0.00	Q				
0+45	0.0001	0.00	Q				
0+50	0.0001	0.00	Q				
0+55	0.0001	0.00	Q				
1+ 0	0.0001	0.00	Q				
1+ 5	0.0001	0.00	Q				
1+10	0.0001	0.00	Q				
1+15	0.0001	0.00	Q				
1+20	0.0001	0.00	Q				
1+25	0.0001	0.00	Q				
1+30	0.0001	0.00	Q				
1+35	0.0001	0.00	Q				
1+40	0.0001	0.00	Q				
1+45	0.0001	0.00	Q				
1+50	0.0001	0.00	Q				
1+55	0.0001	0.00	Q				
2+ 0	0.0002	0.00	Q				
2+ 5	0.0002	0.00	Q				

2+10	0.0002	0.00	Q					
2+15	0.0002	0.00	Q					
2+20	0.0102	1.46	V	Q				
2+25	0.0324	3.21		V	Q			
2+30	0.0674	5.09		V		Q		
2+35	0.1137	6.72			V		Q	
2+40	0.1658	7.57			V			Q
2+45	0.2189	7.70				V		Q
2+50	0.2676	7.07				V		Q
2+55	0.3097	6.11					V	Q
3+ 0	0.3421	4.70				Q	V	
3+ 5	0.3659	3.46			Q			V
3+10	0.3825	2.41			Q			V
3+15	0.3937	1.63			Q			V
3+20	0.4012	1.09						V
3+25	0.4062	0.72		Q				V
3+30	0.4095	0.48		Q				V
3+35	0.4117	0.32		Q				V
3+40	0.4132	0.21		Q				V
3+45	0.4142	0.14	Q					V
3+50	0.4148	0.10	Q					V
3+55	0.4152	0.06	Q					V
4+ 0	0.4155	0.04	Q					V
4+ 5	0.4157	0.03	Q					V
4+10	0.4159	0.02	Q					V
4+15	0.4159	0.01	Q					V
4+20	0.4160	0.01	Q					V
4+25	0.4160	0.01	Q					V
4+30	0.4161	0.00	Q					V
4+35	0.4161	0.00	Q					V
4+40	0.4161	0.00	Q					V
4+45	0.4161	0.00	Q					V
4+50	0.4161	0.00	Q					V

*****HYDROGRAPH DATA*****

Number of intervals = 58

Time interval = 5.0 (Min.)

Maximum/Peak flow rate = 7.704 (CFS)

Total volume = 0.416 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++

Process from Point/Station 1.000 to Point/Station 2.000

**** PRINT CURRENT HYDROGRAPH ****

+++++

P R I N T O F 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	1.9	3.9	5.8	7.7
-----------	---------------	--------	---	-----	-----	-----	-----

0+ 5	0.0000	0.00	Q				
0+10	0.0000	0.00	Q				
0+15	0.0000	0.00	Q				
0+20	0.0000	0.00	Q				
0+25	0.0000	0.00	Q				
0+30	0.0000	0.00	Q				
0+35	0.0000	0.00	Q				
0+40	0.0000	0.00	Q				
0+45	0.0001	0.00	Q				
0+50	0.0001	0.00	Q				
0+55	0.0001	0.00	Q				
1+ 0	0.0001	0.00	Q				
1+ 5	0.0001	0.00	Q				
1+10	0.0001	0.00	Q				
1+15	0.0001	0.00	Q				
1+20	0.0001	0.00	Q				
1+25	0.0001	0.00	Q				
1+30	0.0001	0.00	Q				
1+35	0.0001	0.00	Q				
1+40	0.0001	0.00	Q				
1+45	0.0001	0.00	Q				
1+50	0.0001	0.00	Q				
1+55	0.0001	0.00	Q				
2+ 0	0.0002	0.00	Q				
2+ 5	0.0002	0.00	Q				
2+10	0.0002	0.00	Q				
2+15	0.0002	0.00	Q				
2+20	0.0102	1.46	V Q				
2+25	0.0324	3.21	V Q				
2+30	0.0674	5.09	V Q				
2+35	0.1137	6.72	V Q				
2+40	0.1658	7.57	V Q				
2+45	0.2189	7.70	V Q				
2+50	0.2676	7.07	V Q				
2+55	0.3097	6.11	V Q				
3+ 0	0.3421	4.70	V Q				
3+ 5	0.3659	3.46	V Q				
3+10	0.3825	2.41	V Q				
3+15	0.3937	1.63	V Q				

3+20	0.4012	1.09	Q				V	
3+25	0.4062	0.72	Q				V	
3+30	0.4095	0.48	Q				V	
3+35	0.4117	0.32	Q				V	
3+40	0.4132	0.21	Q				V	
3+45	0.4142	0.14	Q				V	
3+50	0.4148	0.10	Q				V	
3+55	0.4152	0.06	Q				V	
4+ 0	0.4155	0.04	Q				V	
4+ 5	0.4157	0.03	Q				V	
4+10	0.4159	0.02	Q				V	
4+15	0.4159	0.01	Q				V	
4+20	0.4160	0.01	Q				V	
4+25	0.4160	0.01	Q				V	
4+30	0.4161	0.00	Q				V	
4+35	0.4161	0.00	Q				V	
4+40	0.4161	0.00	Q				V	
4+45	0.4161	0.00	Q				V	
4+50	0.4161	0.00	Q				V	

*****HYDROGRAPH DATA*****

Number of intervals = 58

Time interval = 5.0 (Min.)

Maximum/Peak flow rate = 7.704 (CFS)

Total volume = 0.416 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++

Process from Point/Station 1.000 to Point/Station 2.000

*** STORE OR DELETE CURRENT HYDROGRAPH ***

Current stream hydrograph saved in file 3100.rte

*****HYDROGRAPH DATA*****

Number of intervals = 0

Time interval = 0.0 (Min.)

Maximum/Peak flow rate = 0.000 (CFS)

Total volume = 0.000 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

FLOOD HYDROGRAPH ROUTING PROGRAM
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Study date: 10/22/20

ROUTED 6 HOUR 10 YEAR STORM EVENT

Program License Serial Number 6387

***** HYDROGRAPH INFORMATION *****

From study/file name: boulders2610.rte
*****HYDROGRAPH DATA*****
Number of intervals = 37
Time interval = 10.0 (Min.)
Maximum/Peak flow rate = 9.554 (CFS)
Total volume = 1.166 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 37
Hydrograph time unit = 10.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)

Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.016	0.001	0.016	0.016
1.000	0.046	0.001	0.046	0.046
1.500	0.082	0.001	0.082	0.082
2.000	0.125	0.001	0.125	0.125
2.500	0.171	0.001	0.171	0.171
3.000	0.221	0.001	0.221	0.221
3.500	0.273	0.001	0.273	0.273
4.000	0.327	0.001	0.327	0.327
4.500	0.382	0.001	0.382	0.382
5.000	0.438	0.001	0.438	0.438
5.500	0.494	0.000	0.494	0.494
6.000	0.549	3.200	0.527	0.571
6.500	0.603	6.330	0.559	0.647
7.000	0.655	7.980	0.600	0.710
7.500	0.705	9.640	0.639	0.771
8.000	0.751	11.040	0.675	0.827
8.500	0.794	12.280	0.709	0.879
9.000	0.831	13.400	0.739	0.923
9.500	0.860	14.430	0.761	0.959

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)						Depth (Ft.)
0.167	0.59	0.00	0.004	0I	2.4	4.78	7.17	9.55	0.13
0.333	0.91	0.00	0.014	0 I					0.45
0.500	0.98	0.00	0.027	0 I					0.69
0.667	1.06	0.00	0.041	0 I					0.92
0.833	1.09	0.00	0.056	0 I					1.14
1.000	1.14	0.00	0.071	0 I					1.35
1.167	1.22	0.00	0.088	0 I					1.57
1.333	1.24	0.00	0.105	0 I					1.76
1.500	1.24	0.00	0.122	0 I					1.96
1.667	1.24	0.00	0.139	0 I					2.15
1.833	1.24	0.00	0.156	0 I					2.33
2.000	1.29	0.00	0.173	0 I					2.52
2.167	1.32	0.00	0.191	0 I					2.70
2.333	1.37	0.00	0.210	0 I					2.89
2.500	1.40	0.00	0.229	0 I					3.07

2.667	1.40	0.00	0.248	0	I						3.26	
2.833	1.50	0.00	0.268	0	I						3.45	
3.000	1.55	0.00	0.289	0	I						3.65	
3.167	1.60	0.00	0.311	0	I						3.85	
3.333	1.68	0.00	0.333	0	I						4.06	
3.500	1.86	0.00	0.358	0	I						4.28	
3.667	2.10	0.00	0.385	0	I						4.52	
3.833	2.28	0.00	0.415	0	I						4.79	
4.000	2.43	0.00	0.447	0	I						5.08	
4.167	2.69	0.00	0.483	0	I						5.40	
4.333	3.09	1.18	0.514		0	I					5.68	
4.500	3.46	2.38	0.535			0	I				5.87	
4.667	3.79	3.09	0.547				0	I			5.98	
4.833	4.12	3.59	0.556					0	I		6.06	
5.000	4.45	3.99	0.563						0	I	6.13	
5.167	5.78	4.63	0.574					0	I		6.23	
5.333	7.40	5.75	0.593						0	I	6.41	
5.500	9.55	6.94	0.622							0	I	6.69
5.667	4.72	7.01	0.624					I		0		6.71
5.833	1.26	5.12	0.582		I				0			6.31
6.000	0.53	2.71	0.541	I		0						5.92
6.167	0.12	1.35	0.517	I	0							5.71
6.333	0.00	0.61	0.505	I	0							5.60
6.500	0.00	0.26	0.498	0								5.54
6.667	0.00	0.11	0.496	0								5.52
6.833	0.00	0.05	0.495	0								5.51
7.000	0.00	0.02	0.494	0								5.50
7.167	0.00	0.01	0.494	0								5.50
7.333	0.00	0.00	0.494	0								5.50
7.500	0.00	0.00	0.494	0								5.50
7.667	0.00	0.00	0.494	0								5.50

Remaining water in basin = 0.49 (Ac.Ft)

*****HYDROGRAPH DATA*****

Number of intervals = 46

Time interval = 10.0 (Min.)

Maximum/Peak flow rate = 7.012 (CFS)

Total volume = 0.672 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

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 Process from Point/Station 1.000 to Point/Station 2.000
 **** PRINT CURRENT HYDROGRAPH ****

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 P R I N T O F S T O R M
 R u n o f f H y d r o g r a p h

Hydrograph in 10 Minute intervals (CFS)

Time(h+m)	Volume(Ac.Ft)	Q(CFS)	0	1.8	3.5	5.3	7.0
0+10	0.0000	0.00	Q				
0+20	0.0000	0.00	Q				
0+30	0.0000	0.00	Q				
0+40	0.0000	0.00	Q				
0+50	0.0001	0.00	Q				
1+ 0	0.0001	0.00	Q				
1+10	0.0001	0.00	Q				
1+20	0.0001	0.00	Q				
1+30	0.0001	0.00	Q				
1+40	0.0001	0.00	Q				
1+50	0.0001	0.00	Q				
2+ 0	0.0002	0.00	Q				
2+10	0.0002	0.00	Q				
2+20	0.0002	0.00	Q				
2+30	0.0002	0.00	Q				
2+40	0.0002	0.00	Q				
2+50	0.0002	0.00	Q				
3+ 0	0.0002	0.00	Q				
3+10	0.0002	0.00	Q				
3+20	0.0003	0.00	Q				
3+30	0.0003	0.00	Q				
3+40	0.0003	0.00	Q				
3+50	0.0003	0.00	Q				
4+ 0	0.0003	0.00	Q				
4+10	0.0003	0.00	Q				
4+20	0.0166	1.18	V	Q			
4+30	0.0493	2.38	V	Q			
4+40	0.0919	3.09	V	Q			
4+50	0.1413	3.59	V	Q			
5+ 0	0.1962	3.99	V	Q			
5+10	0.2600	4.63	V	Q			
5+20	0.3391	5.75	V	Q			
5+30	0.4348	6.94	V	Q			
5+40	0.5313	7.01	V	Q			
5+50	0.6019	5.12	V	Q			
6+ 0	0.6392	2.71	V	Q			
6+10	0.6578	1.35	V	Q			

6+20	0.6662	0.61	Q				V
6+30	0.6698	0.26	Q				V
6+40	0.6713	0.11	Q				V
6+50	0.6720	0.05	Q				V
7+ 0	0.6723	0.02	Q				V
7+10	0.6724	0.01	Q				V
7+20	0.6724	0.00	Q				V
7+30	0.6725	0.00	Q				V
7+40	0.6725	0.00	Q				V

*****HYDROGRAPH DATA*****

Number of intervals = 46
Time interval = 10.0 (Min.)
Maximum/Peak flow rate = 7.012 (CFS)
Total volume = 0.672 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

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Process from Point/Station 1.000 to Point/Station 2.000
**** PRINT CURRENT HYDROGRAPH ****

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P R I N T O F S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 10 Minute intervals (CFS)

Time(h+m)	Volume(Ac.Ft)	Q(CFS)	0	1.8	3.5	5.3	7.0
0+10	0.0000	0.00	Q				
0+20	0.0000	0.00	Q				
0+30	0.0000	0.00	Q				
0+40	0.0000	0.00	Q				
0+50	0.0001	0.00	Q				
1+ 0	0.0001	0.00	Q				
1+10	0.0001	0.00	Q				
1+20	0.0001	0.00	Q				
1+30	0.0001	0.00	Q				
1+40	0.0001	0.00	Q				
1+50	0.0001	0.00	Q				
2+ 0	0.0002	0.00	Q				
2+10	0.0002	0.00	Q				

2+20	0.0002	0.00	Q						
2+30	0.0002	0.00	Q						
2+40	0.0002	0.00	Q						
2+50	0.0002	0.00	Q						
3+ 0	0.0002	0.00	Q						
3+10	0.0002	0.00	Q						
3+20	0.0003	0.00	Q						
3+30	0.0003	0.00	Q						
3+40	0.0003	0.00	Q						
3+50	0.0003	0.00	Q						
4+ 0	0.0003	0.00	Q						
4+10	0.0003	0.00	Q						
4+20	0.0166	1.18	V	Q					
4+30	0.0493	2.38	V		Q				
4+40	0.0919	3.09	V			Q			
4+50	0.1413	3.59		V			Q		
5+ 0	0.1962	3.99			V			Q	
5+10	0.2600	4.63				V			Q
5+20	0.3391	5.75					V		
5+30	0.4348	6.94						V	Q
5+40	0.5313	7.01							Q
5+50	0.6019	5.12					Q	V	
6+ 0	0.6392	2.71							V
6+10	0.6578	1.35		Q					V
6+20	0.6662	0.61			Q				V
6+30	0.6698	0.26	Q						V
6+40	0.6713	0.11	Q						V
6+50	0.6720	0.05	Q						V
7+ 0	0.6723	0.02	Q						V
7+10	0.6724	0.01	Q						V
7+20	0.6724	0.00	Q						V
7+30	0.6725	0.00	Q						V
7+40	0.6725	0.00	Q						V

*****HYDROGRAPH DATA*****

Number of intervals = 46

Time interval = 10.0 (Min.)

Maximum/Peak flow rate = 7.012 (CFS)

Total volume = 0.672 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

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Process from Point/Station 1.000 to Point/Station 2.000

**** STORE OR DELETE CURRENT HYDROGRAPH ****

Current stream hydrograph saved in file 3100.rte

*****HYDROGRAPH DATA*****

Number of intervals = 0

Time interval = 0.0 (Min.)

Maximum/Peak flow rate = 0.000 (CFS)

Total volume = 0.000 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014
Study date: 10/22/20

ROUTED 24 HOUR 10 YEAR STORM EVENT

Program License Serial Number 6387

***** HYDROGRAPH INFORMATION *****

From study/file name: boulders22410.rte
*****HYDROGRAPH DATA*****
Number of intervals = 97
Time interval = 15.0 (Min.)
Maximum/Peak flow rate = 3.459 (CFS)
Total volume = 1.907 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 97
Hydrograph time unit = 15.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)

Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.016	0.001	0.016	0.016
1.000	0.046	0.001	0.046	0.046
1.500	0.082	0.001	0.082	0.082
2.000	0.125	0.001	0.125	0.125
2.500	0.171	0.001	0.171	0.171
3.000	0.221	0.001	0.221	0.221
3.500	0.273	0.001	0.273	0.273
4.000	0.327	0.001	0.327	0.327
4.500	0.382	0.001	0.382	0.382
5.000	0.438	0.001	0.438	0.438
5.500	0.494	0.000	0.494	0.494
6.000	0.549	3.200	0.516	0.582
6.500	0.603	6.330	0.538	0.668
7.000	0.655	7.980	0.573	0.737
7.500	0.705	9.640	0.605	0.805
8.000	0.751	11.040	0.637	0.865
8.500	0.794	12.280	0.667	0.921
9.000	0.831	13.400	0.693	0.969
9.500	0.860	14.430	0.711	1.009

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)						Depth (Ft.)
0.250	0.14	0.00	0.001	0I	0.9	1.73	2.59	3.46	0.05
0.500	0.25	0.00	0.006	0 I					0.17
0.750	0.27	0.00	0.011	0 I					0.34
1.000	0.34	0.00	0.017	0 I					0.52
1.250	0.29	0.00	0.024	0 I					0.63
1.500	0.27	0.00	0.030	0 I					0.73
1.750	0.27	0.00	0.035	0 I					0.82
2.000	0.34	0.00	0.041	0 I					0.92
2.250	0.36	0.00	0.049	0 I					1.04
2.500	0.36	0.00	0.056	0 I					1.14
2.750	0.43	0.00	0.064	0 I					1.26
3.000	0.45	0.00	0.074	0 I					1.38
3.250	0.45	0.00	0.083	0 I					1.51
3.500	0.45	0.00	0.092	0 I					1.62
3.750	0.45	0.00	0.102	0 I					1.73

4.000	0.52	0.00	0.112	0	I							1.84
4.250	0.54	0.00	0.123	0	I							1.97
4.500	0.61	0.00	0.135	0	I							2.10
4.750	0.63	0.00	0.147	0	I							2.24
5.000	0.70	0.00	0.161	0	I							2.39
5.250	0.58	0.00	0.175	0	I							2.54
5.500	0.61	0.00	0.187	0	I							2.66
5.750	0.70	0.00	0.200	0	I							2.79
6.000	0.72	0.00	0.215	0	I							2.94
6.250	0.80	0.00	0.231	0	I							3.09
6.500	0.82	0.00	0.247	0	I							3.25
6.750	0.89	0.00	0.265	0	I							3.42
7.000	0.91	0.00	0.284	0	I							3.60
7.250	0.91	0.00	0.302	0	I							3.77
7.500	0.98	0.00	0.322	0	I							3.95
7.750	1.07	0.00	0.343	0	I							4.14
8.000	1.16	0.00	0.366	0	I							4.35
8.250	1.32	0.00	0.391	0		I						4.58
8.500	1.36	0.00	0.419	0		I						4.83
8.750	1.43	0.00	0.448	0		I						5.09
9.000	1.52	0.00	0.478	0		I						5.36
9.250	1.68	0.62	0.505		0	I						5.60
9.500	1.79	1.46	0.519			0	I					5.73
9.750	1.88	1.74	0.524				OI					5.77
10.000	1.97	1.88	0.526				OI					5.79
10.250	1.50	1.77	0.524			I	0					5.78
10.500	1.36	1.51	0.520			IO						5.74
10.750	1.71	1.53	0.520			OI						5.74
11.000	1.81	1.70	0.523			OI						5.77
11.250	1.74	1.76	0.524			0						5.77
11.500	1.72	1.74	0.524			IO						5.77
11.750	1.58	1.67	0.523			IO						5.76
12.000	1.61	1.61	0.522			0						5.75
12.250	2.13	1.80	0.525			0	I					5.78
12.500	2.35	2.13	0.531				0	I				5.83
12.750	2.58	2.38	0.535					OI				5.87
13.000	2.75	2.60	0.539					OI				5.91
13.250	3.30	2.92	0.544						0	I		5.96
13.500	3.46	3.27	0.550							0	I	6.01
13.750	2.38	3.01	0.546					I	0			5.97
14.000	2.08	2.43	0.536				I	0				5.88
14.250	2.49	2.32	0.534					OI				5.86
14.500	2.51	2.45	0.536					OI				5.88
14.750	2.49	2.49	0.537					0				5.89
15.000	2.41	2.46	0.536					0				5.88
15.250	2.29	2.38	0.535					0				5.87
15.500	2.17	2.27	0.533					0				5.85
15.750	1.81	2.06	0.529				I	0				5.82
16.000	1.72	1.84	0.526				I	0				5.79
16.250	0.66	1.35	0.517		I	0						5.71

16.500	0.36	0.72	0.506	I 0					5.61
16.750	0.29	0.42	0.501	IO					5.57
17.000	0.27	0.32	0.499	0					5.55
17.250	0.41	0.34	0.500	0					5.55
17.500	0.45	0.41	0.501	OI					5.56
17.750	0.45	0.44	0.502	0					5.57
18.000	0.38	0.42	0.501	0					5.57
18.250	0.36	0.38	0.501	0					5.56
18.500	0.36	0.37	0.500	0					5.56
18.750	0.29	0.34	0.500	IO					5.55
19.000	0.20	0.27	0.499	IO					5.54
19.250	0.25	0.24	0.498	0					5.54
19.500	0.34	0.28	0.499	OI					5.54
19.750	0.29	0.31	0.499	0					5.55
20.000	0.20	0.26	0.498	IO					5.54
20.250	0.25	0.24	0.498	0					5.54
20.500	0.27	0.26	0.498	0					5.54
20.750	0.27	0.27	0.499	0					5.54
21.000	0.20	0.24	0.498	IO					5.54
21.250	0.25	0.23	0.498	0					5.54
21.500	0.20	0.23	0.498	IO					5.54
21.750	0.25	0.23	0.498	0					5.54
22.000	0.20	0.23	0.498	IO					5.54
22.250	0.25	0.23	0.498	0					5.54
22.500	0.20	0.23	0.498	IO					5.54
22.750	0.18	0.20	0.497	0					5.53
23.000	0.18	0.19	0.497	0					5.53
23.250	0.18	0.18	0.497	0					5.53
23.500	0.18	0.18	0.497	0					5.53
23.750	0.18	0.18	0.497	0					5.53
24.000	0.18	0.18	0.497	0					5.53
24.250	0.04	0.13	0.496	IO					5.52
24.500	0.00	0.05	0.495	0					5.51
24.750	0.00	0.01	0.494	0					5.50
25.000	0.00	0.00	0.494	0					5.50
25.250	0.00	0.00	0.494	0					5.50

Remaining water in basin = 0.49 (Ac.Ft)

*****HYDROGRAPH DATA*****

Number of intervals = 101

Time interval = 15.0 (Min.)

Maximum/Peak flow rate = 3.266 (CFS)

Total volume = 1.413 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

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Process from Point/Station 1.000 to Point/Station 2.000
**** PRINT CURRENT HYDROGRAPH ****

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 P R I N T O F S T O R M
 R u n o f f H y d r o g r a p h

Hydrograph in 15 Minute intervals (CFS)

Time(h+m)	Volume(Ac.Ft)	Q(CFS)	0	0.8	1.6	2.4	3.3
0+15	0.0000	0.00	Q				
0+30	0.0000	0.00	Q				
0+45	0.0000	0.00	Q				
1+ 0	0.0000	0.00	Q				
1+15	0.0001	0.00	Q				
1+30	0.0001	0.00	Q				
1+45	0.0001	0.00	Q				
2+ 0	0.0001	0.00	Q				
2+15	0.0001	0.00	Q				
2+30	0.0002	0.00	Q				
2+45	0.0002	0.00	Q				
3+ 0	0.0002	0.00	Q				
3+15	0.0002	0.00	Q				
3+30	0.0003	0.00	Q				
3+45	0.0003	0.00	Q				
4+ 0	0.0003	0.00	Q				
4+15	0.0003	0.00	Q				
4+30	0.0003	0.00	Q				
4+45	0.0004	0.00	Q				
5+ 0	0.0004	0.00	Q				
5+15	0.0004	0.00	Q				
5+30	0.0004	0.00	Q				
5+45	0.0004	0.00	Q				
6+ 0	0.0005	0.00	Q				
6+15	0.0005	0.00	Q				
6+30	0.0005	0.00	Q				
6+45	0.0005	0.00	Q				
7+ 0	0.0005	0.00	Q				
7+15	0.0006	0.00	Q				
7+30	0.0006	0.00	Q				
7+45	0.0006	0.00	Q				
8+ 0	0.0006	0.00	Q				

8+15	0.0006	0.00	Q					
8+30	0.0007	0.00	Q					
8+45	0.0007	0.00	Q					
9+ 0	0.0007	0.00	Q					
9+15	0.0136	0.62	V	Q				
9+30	0.0437	1.46	V		Q			
9+45	0.0797	1.74	V			Q		
10+ 0	0.1186	1.88	V				Q	
10+15	0.1552	1.77	V				Q	
10+30	0.1865	1.51	V		Q			
10+45	0.2181	1.53	V		Q			
11+ 0	0.2533	1.70	V			Q		
11+15	0.2896	1.76	V			Q		
11+30	0.3255	1.74	V			Q		
11+45	0.3600	1.67	V			Q		
12+ 0	0.3934	1.61		V	Q			
12+15	0.4307	1.80		V		Q		
12+30	0.4746	2.13		V			Q	
12+45	0.5238	2.38		V			Q	
13+ 0	0.5775	2.60			V			Q
13+15	0.6378	2.92			V			Q
13+30	0.7053	3.27			V			Q
13+45	0.7674	3.01			V			Q
14+ 0	0.8176	2.43				V	Q	
14+15	0.8655	2.32				V	Q	
14+30	0.9162	2.45				V	Q	
14+45	0.9676	2.49				V	Q	
15+ 0	1.0184	2.46					V	Q
15+15	1.0675	2.38					Q	V
15+30	1.1143	2.27					Q	V
15+45	1.1569	2.06					Q	V
16+ 0	1.1949	1.84					Q	V
16+15	1.2229	1.35			Q			V
16+30	1.2378	0.72		Q				V
16+45	1.2465	0.42		Q				V
17+ 0	1.2531	0.32		Q				V
17+15	1.2600	0.34		Q				V
17+30	1.2685	0.41		Q				V
17+45	1.2776	0.44		Q				V
18+ 0	1.2864	0.42		Q				V
18+15	1.2943	0.38		Q				V
18+30	1.3019	0.37		Q				V
18+45	1.3089	0.34		Q				V
19+ 0	1.3144	0.27		Q				V
19+15	1.3193	0.24	Q					V
19+30	1.3252	0.28	Q					V
19+45	1.3315	0.31	Q					V
20+ 0	1.3369	0.26	Q					V
20+15	1.3418	0.24	Q					V
20+30	1.3471	0.26	Q					V

20+45	1.3526	0.27	Q				V
21+ 0	1.3576	0.24	Q				V
21+15	1.3624	0.23	Q				V
21+30	1.3671	0.23	Q				V
21+45	1.3718	0.23	Q				V
22+ 0	1.3765	0.23	Q				V
22+15	1.3811	0.23	Q				V
22+30	1.3858	0.23	Q				V
22+45	1.3899	0.20	Q				V
23+ 0	1.3938	0.19	Q				V
23+15	1.3976	0.18	Q				V
23+30	1.4013	0.18	Q				V
23+45	1.4050	0.18	Q				V
24+ 0	1.4088	0.18	Q				V
24+15	1.4114	0.13	Q				V
24+30	1.4124	0.05	Q				V
24+45	1.4126	0.01	Q				V
25+ 0	1.4127	0.00	Q				V
25+15	1.4127	0.00	Q				V

*****HYDROGRAPH DATA*****

Number of intervals = 101

Time interval = 15.0 (Min.)

Maximum/Peak flow rate = 3.266 (CFS)

Total volume = 1.413 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

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Process from Point/Station 1.000 to Point/Station 2.000

**** PRINT CURRENT HYDROGRAPH ****

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PRINT OF STORM
Run off Hydrograph

Hydrograph in 15 Minute intervals (CFS)

Time(h+m)	Volume(Ac.Ft)	Q(CFS)	0	0.8	1.6	2.4	3.3
0+15	0.0000	0.00	Q				
0+30	0.0000	0.00	Q				
0+45	0.0000	0.00	Q				

1+ 0	0.0000	0.00	Q						
1+15	0.0001	0.00	Q						
1+30	0.0001	0.00	Q						
1+45	0.0001	0.00	Q						
2+ 0	0.0001	0.00	Q						
2+15	0.0001	0.00	Q						
2+30	0.0002	0.00	Q						
2+45	0.0002	0.00	Q						
3+ 0	0.0002	0.00	Q						
3+15	0.0002	0.00	Q						
3+30	0.0003	0.00	Q						
3+45	0.0003	0.00	Q						
4+ 0	0.0003	0.00	Q						
4+15	0.0003	0.00	Q						
4+30	0.0003	0.00	Q						
4+45	0.0004	0.00	Q						
5+ 0	0.0004	0.00	Q						
5+15	0.0004	0.00	Q						
5+30	0.0004	0.00	Q						
5+45	0.0004	0.00	Q						
6+ 0	0.0005	0.00	Q						
6+15	0.0005	0.00	Q						
6+30	0.0005	0.00	Q						
6+45	0.0005	0.00	Q						
7+ 0	0.0005	0.00	Q						
7+15	0.0006	0.00	Q						
7+30	0.0006	0.00	Q						
7+45	0.0006	0.00	Q						
8+ 0	0.0006	0.00	Q						
8+15	0.0006	0.00	Q						
8+30	0.0007	0.00	Q						
8+45	0.0007	0.00	Q						
9+ 0	0.0007	0.00	Q						
9+15	0.0136	0.62	V	Q					
9+30	0.0437	1.46	V		Q				
9+45	0.0797	1.74	V			Q	Q		
10+ 0	0.1186	1.88	V				Q		
10+15	0.1552	1.77	V				Q		
10+30	0.1865	1.51	V			Q			
10+45	0.2181	1.53	V			Q			
11+ 0	0.2533	1.70	V				Q		
11+15	0.2896	1.76	V				Q		
11+30	0.3255	1.74	V				Q		
11+45	0.3600	1.67	V				Q		
12+ 0	0.3934	1.61	V			Q			
12+15	0.4307	1.80	V				Q		
12+30	0.4746	2.13	V					Q	
12+45	0.5238	2.38	V					Q	Q
13+ 0	0.5775	2.60	V						Q
13+15	0.6378	2.92	V						Q

13+30	0.7053	3.27			V				Q
13+45	0.7674	3.01			V				Q
14+ 0	0.8176	2.43				V		Q	
14+15	0.8655	2.32				V		Q	
14+30	0.9162	2.45					V	Q	
14+45	0.9676	2.49						V	Q
15+ 0	1.0184	2.46						V	Q
15+15	1.0675	2.38						QV	
15+30	1.1143	2.27					Q	V	
15+45	1.1569	2.06					Q		
16+ 0	1.1949	1.84						V	
16+15	1.2229	1.35			Q			V	
16+30	1.2378	0.72		Q				V	
16+45	1.2465	0.42		Q				V	
17+ 0	1.2531	0.32	Q					V	
17+15	1.2600	0.34	Q					V	
17+30	1.2685	0.41	Q					V	
17+45	1.2776	0.44	Q					V	
18+ 0	1.2864	0.42	Q					V	
18+15	1.2943	0.38	Q					V	
18+30	1.3019	0.37	Q					V	
18+45	1.3089	0.34	Q					V	
19+ 0	1.3144	0.27	Q					V	
19+15	1.3193	0.24	Q					V	
19+30	1.3252	0.28	Q					V	
19+45	1.3315	0.31	Q					V	
20+ 0	1.3369	0.26	Q					V	
20+15	1.3418	0.24	Q					V	
20+30	1.3471	0.26	Q					V	
20+45	1.3526	0.27	Q					V	
21+ 0	1.3576	0.24	Q					V	
21+15	1.3624	0.23	Q					V	
21+30	1.3671	0.23	Q					V	
21+45	1.3718	0.23	Q					V	
22+ 0	1.3765	0.23	Q					V	
22+15	1.3811	0.23	Q					V	
22+30	1.3858	0.23	Q					V	
22+45	1.3899	0.20	Q					V	
23+ 0	1.3938	0.19	Q					V	
23+15	1.3976	0.18	Q					V	
23+30	1.4013	0.18	Q					V	
23+45	1.4050	0.18	Q					V	
24+ 0	1.4088	0.18	Q					V	
24+15	1.4114	0.13	Q					V	
24+30	1.4124	0.05	Q					V	
24+45	1.4126	0.01	Q					V	
25+ 0	1.4127	0.00	Q					V	
25+15	1.4127	0.00	Q					V	

*****HYDROGRAPH DATA*****

```

        Number of intervals = 101
        Time interval = 15.0 (Min.)
        Maximum/Peak flow rate = 3.266 (CFS)
        Total volume = 1.413 (Ac.Ft)
        Status of hydrographs being held in storage
            Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
        Peak (CFS) 0.000 0.000 0.000 0.000 0.000
        Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000
        *****

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Process from Point/Station 1.000 to Point/Station 2.000
**** STORE OR DELETE CURRENT HYDROGRAPH ****

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Current stream hydrograph saved in file 3100.rte
*****HYDROGRAPH DATA*****
        Number of intervals = 0
        Time interval = 0.0 (Min.)
        Maximum/Peak flow rate = 0.000 (CFS)
        Total volume = 0.000 (Ac.Ft)
        Status of hydrographs being held in storage
            Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
        Peak (CFS) 0.000 0.000 0.000 0.000 0.000
        Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000
        *****

```

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014
Study date: 10/22/20

ROUTED 3 HOUR 100 YEAR STORM

Program License Serial Number 6387

***** HYDROGRAPH INFORMATION *****

From study/file name: boulders23100.rte
*****HYDROGRAPH DATA*****
Number of intervals = 39
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 19.275 (CFS)
Total volume = 1.663 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 39
Hydrograph time unit = 5.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)

Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.016	0.001	0.016	0.016
1.000	0.046	0.001	0.046	0.046
1.500	0.082	0.001	0.082	0.082
2.000	0.125	0.001	0.125	0.125
2.500	0.171	0.001	0.171	0.171
3.000	0.221	0.001	0.221	0.221
3.500	0.273	0.001	0.273	0.273
4.000	0.327	0.001	0.327	0.327
4.500	0.382	0.001	0.382	0.382
5.000	0.438	0.001	0.438	0.438
5.500	0.494	0.000	0.494	0.494
6.000	0.549	3.200	0.538	0.560
6.500	0.603	6.330	0.581	0.625
7.000	0.655	7.980	0.628	0.682
7.500	0.705	9.640	0.672	0.738
8.000	0.751	11.040	0.713	0.789
8.500	0.794	12.280	0.752	0.836
9.000	0.831	13.400	0.785	0.877
9.500	0.860	14.430	0.810	0.910

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	4.8	9.64	14.46	19.27	Depth (Ft.)
0.083	1.36	0.00	0.005	0	I				0.15
0.167	2.54	0.00	0.018	0	I				0.54
0.250	2.51	0.00	0.035	0	I				0.82
0.333	2.87	0.00	0.054	0	I				1.11
0.417	3.27	0.00	0.075	0	I				1.41
0.500	3.71	0.00	0.099	0	I				1.70
0.583	3.69	0.00	0.125	0	I				2.00
0.667	3.80	0.00	0.150	0	I				2.28
0.750	4.09	0.00	0.178	0	I				2.57
0.833	3.75	0.00	0.205	0	I				2.84
0.917	3.57	0.00	0.230	0	I				3.08
1.000	3.87	0.00	0.255	0	I				3.33
1.083	4.59	0.00	0.285	0	I				3.61
1.167	5.07	0.00	0.318	0	I				3.91
1.250	5.16	0.00	0.353	0	I				4.24

1.333	4.94	0.00	0.388	0		I						4.55
1.417	5.48	0.00	0.424	0		I						4.87
1.500	6.21	0.00	0.464	0		I						5.23
1.583	6.05	0.59	0.504	0		I						5.59
1.667	6.17	2.43	0.536		0	I						5.88
1.750	7.19	3.85	0.560		0	I						6.10
1.833	7.63	5.03	0.581			0	I					6.29
1.917	7.31	5.84	0.595			0	I					6.42
2.000	7.22	6.32	0.603			0	I					6.50
2.083	7.40	6.52	0.609			0	I					6.56
2.167	8.89	6.84	0.619				0	I				6.65
2.250	11.12	7.46	0.639				0		I			6.84
2.333	10.33	8.11	0.659				0		I			7.04
2.417	13.09	8.85	0.681				0			I		7.26
2.500	17.05	10.09	0.720					0			I	7.66
2.583	19.27	11.59	0.770						0		I	8.22
2.667	17.71	12.86	0.813							0	I	8.76
2.750	10.54	13.10	0.821					I		0		8.87
2.833	5.67	12.17	0.790			I				0		8.45
2.917	4.50	10.88	0.746		I				0			7.94
3.000	2.70	9.49	0.700		I			0				7.45
3.083	0.89	7.91	0.653	I				0				6.98
3.167	0.20	6.46	0.607	I			0					6.54
3.250	0.03	4.44	0.570	I		0						6.20
3.333	0.00	2.97	0.545	I	0							5.96
3.417	0.00	1.98	0.528	I	0							5.81
3.500	0.00	1.32	0.517	I	0							5.71
3.583	0.00	0.88	0.509	I	0							5.64
3.667	0.00	0.58	0.504	0								5.59
3.750	0.00	0.39	0.501	0								5.56
3.833	0.00	0.26	0.498	0								5.54
3.917	0.00	0.17	0.497	0								5.53
4.000	0.00	0.12	0.496	0								5.52
4.083	0.00	0.08	0.495	0								5.51
4.167	0.00	0.05	0.495	0								5.51
4.250	0.00	0.03	0.495	0								5.51
4.333	0.00	0.02	0.494	0								5.50
4.417	0.00	0.02	0.494	0								5.50
4.500	0.00	0.01	0.494	0								5.50
4.583	0.00	0.01	0.494	0								5.50
4.667	0.00	0.00	0.494	0								5.50
4.750	0.00	0.00	0.494	0								5.50
4.833	0.00	0.00	0.494	0								5.50
4.917	0.00	0.00	0.494	0								5.50
5.000	0.00	0.00	0.494	0								5.50

Remaining water in basin = 0.49 (Ac.Ft)

*****HYDROGRAPH DATA*****

Number of intervals = 60
Time interval = 5.0 (Min.)
Maximum/Peak flow rate = 13.103 (CFS)
Total volume = 1.169 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

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Process from Point/Station 1.000 to Point/Station 2.000
**** PRINT CURRENT HYDROGRAPH ****

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PRINT OF STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals (CFS)

Time(h+m) Volume(Ac.Ft) Q(CFS) 0 3.3 6.6 9.8 13.1

0+ 5	0.0000	0.00	Q					
0+10	0.0000	0.00	Q					
0+15	0.0000	0.00	Q					
0+20	0.0000	0.00	Q					
0+25	0.0000	0.00	Q					
0+30	0.0000	0.00	Q					
0+35	0.0000	0.00	Q					
0+40	0.0001	0.00	Q					
0+45	0.0001	0.00	Q					
0+50	0.0001	0.00	Q					
0+55	0.0001	0.00	Q					
1+ 0	0.0001	0.00	Q					
1+ 5	0.0001	0.00	Q					
1+10	0.0001	0.00	Q					
1+15	0.0001	0.00	Q					
1+20	0.0001	0.00	Q					
1+25	0.0001	0.00	Q					
1+30	0.0001	0.00	Q					
1+35	0.0042	0.59	VQ					
1+40	0.0209	2.43	V	Q				
1+45	0.0474	3.85	V	Q				
1+50	0.0821	5.03	V	Q				
1+55	0.1223	5.84	V	Q				

2+ 0	0.1659	6.32		V		Q			
2+ 5	0.2107	6.52		V		Q			
2+10	0.2578	6.84		V		Q			
2+15	0.3092	7.46			V		Q		
2+20	0.3651	8.11			V		Q		
2+25	0.4260	8.85			V			Q	
2+30	0.4955	10.09				V		Q	
2+35	0.5753	11.59				V			Q
2+40	0.6639	12.86					V		Q
2+45	0.7542	13.10					V		Q
2+50	0.8380	12.17						V	Q
2+55	0.9129	10.88						V	Q
3+ 0	0.9782	9.49					Q		V
3+ 5	1.0327	7.91					Q		V
3+10	1.0772	6.46				Q			V
3+15	1.1078	4.44			Q				V
3+20	1.1282	2.97			Q				V
3+25	1.1418	1.98		Q					V
3+30	1.1509	1.32		Q					V
3+35	1.1569	0.88	Q						V
3+40	1.1609	0.58	Q						V
3+45	1.1636	0.39	Q						V
3+50	1.1654	0.26	Q						V
3+55	1.1666	0.17	Q						V
4+ 0	1.1674	0.12	Q						V
4+ 5	1.1679	0.08	Q						V
4+10	1.1683	0.05	Q						V
4+15	1.1685	0.03	Q						V
4+20	1.1687	0.02	Q						V
4+25	1.1688	0.02	Q						V
4+30	1.1688	0.01	Q						V
4+35	1.1689	0.01	Q						V
4+40	1.1689	0.00	Q						V
4+45	1.1689	0.00	Q						V
4+50	1.1689	0.00	Q						V
4+55	1.1690	0.00	Q						V
5+ 0	1.1690	0.00	Q						V

*****HYDROGRAPH DATA*****

Number of intervals = 60

Time interval = 5.0 (Min.)

Maximum/Peak flow rate = 13.103 (CFS)

Total volume = 1.169 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

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Process from Point/Station      1.000 to Point/Station      2.000
**** PRINT CURRENT HYDROGRAPH ****

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P R I N T O F S T O R M
R u n o f f H y d r o g r a p h

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Hydrograph in 5 Minute intervals (CFS)

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Time(h+m) Volume(Ac.Ft)    Q(CFS)    0            3.3            6.6            9.8            13.1
-----

```

0+ 5	0.0000	0.00	Q					
0+10	0.0000	0.00	Q					
0+15	0.0000	0.00	Q					
0+20	0.0000	0.00	Q					
0+25	0.0000	0.00	Q					
0+30	0.0000	0.00	Q					
0+35	0.0000	0.00	Q					
0+40	0.0001	0.00	Q					
0+45	0.0001	0.00	Q					
0+50	0.0001	0.00	Q					
0+55	0.0001	0.00	Q					
1+ 0	0.0001	0.00	Q					
1+ 5	0.0001	0.00	Q					
1+10	0.0001	0.00	Q					
1+15	0.0001	0.00	Q					
1+20	0.0001	0.00	Q					
1+25	0.0001	0.00	Q					
1+30	0.0001	0.00	Q					
1+35	0.0042	0.59	VQ					
1+40	0.0209	2.43	V	Q				
1+45	0.0474	3.85	V		Q			
1+50	0.0821	5.03	V	V		Q		
1+55	0.1223	5.84		V		Q		
2+ 0	0.1659	6.32		V		Q		
2+ 5	0.2107	6.52			V		Q	
2+10	0.2578	6.84			V		Q	
2+15	0.3092	7.46			V		Q	
2+20	0.3651	8.11				V		Q
2+25	0.4260	8.85				V		Q
2+30	0.4955	10.09					V	Q
2+35	0.5753	11.59					V	Q
2+40	0.6639	12.86						Q
2+45	0.7542	13.10						Q
2+50	0.8380	12.17						Q
2+55	0.9129	10.88						Q

3+ 0	0.9782	9.49				Q	V	
3+ 5	1.0327	7.91				Q	V	
3+10	1.0772	6.46			Q		V	
3+15	1.1078	4.44		Q			V	
3+20	1.1282	2.97		Q			V	
3+25	1.1418	1.98		Q			V	
3+30	1.1509	1.32		Q			V	
3+35	1.1569	0.88	Q				V	
3+40	1.1609	0.58	Q				V	
3+45	1.1636	0.39	Q				V	
3+50	1.1654	0.26	Q				V	
3+55	1.1666	0.17	Q				V	
4+ 0	1.1674	0.12	Q				V	
4+ 5	1.1679	0.08	Q				V	
4+10	1.1683	0.05	Q				V	
4+15	1.1685	0.03	Q				V	
4+20	1.1687	0.02	Q				V	
4+25	1.1688	0.02	Q				V	
4+30	1.1688	0.01	Q				V	
4+35	1.1689	0.01	Q				V	
4+40	1.1689	0.00	Q				V	
4+45	1.1689	0.00	Q				V	
4+50	1.1689	0.00	Q				V	
4+55	1.1690	0.00	Q				V	
5+ 0	1.1690	0.00	Q				V	

*****HYDROGRAPH DATA*****

Number of intervals = 60

Time interval = 5.0 (Min.)

Maximum/Peak flow rate = 13.103 (CFS)

Total volume = 1.169 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++

Process from Point/Station 1.000 to Point/Station 2.000

**** STORE OR DELETE CURRENT HYDROGRAPH ****

Current stream hydrograph saved in file 3100.rte

*****HYDROGRAPH DATA*****

Number of intervals = 0

Time interval = 0.0 (Min.)

Maximum/Peak flow rate = 0.000 (CFS)

Total volume = 0.000 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014
Study date: 10/22/20

ROUTED 6 HOUR 100 YEAR STORM

Program License Serial Number 6387

***** HYDROGRAPH INFORMATION *****

From study/file name: boulders26100.rte
*****HYDROGRAPH DATA*****
Number of intervals = 37
Time interval = 10.0 (Min.)
Maximum/Peak flow rate = 15.922 (CFS)
Total volume = 2.089 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 37
Hydrograph time unit = 10.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)

Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.016	0.001	0.016	0.016
1.000	0.046	0.001	0.046	0.046
1.500	0.082	0.001	0.082	0.082
2.000	0.125	0.001	0.125	0.125
2.500	0.171	0.001	0.171	0.171
3.000	0.221	0.001	0.221	0.221
3.500	0.273	0.001	0.273	0.273
4.000	0.327	0.001	0.327	0.327
4.500	0.382	0.001	0.382	0.382
5.000	0.438	0.001	0.438	0.438
5.500	0.494	0.000	0.494	0.494
6.000	0.549	3.200	0.527	0.571
6.500	0.603	6.330	0.559	0.647
7.000	0.655	7.980	0.600	0.710
7.500	0.705	9.640	0.639	0.771
8.000	0.751	11.040	0.675	0.827
8.500	0.794	12.280	0.709	0.879
9.000	0.831	13.400	0.739	0.923
9.500	0.860	14.430	0.761	0.959

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)						Depth (Ft.)
0.167	0.91	0.00	0.006	0I	4.0	7.96	11.94	15.92	0.20
0.333	1.44	0.00	0.022	0 I					0.61
0.500	1.62	0.00	0.044	0 I					0.96
0.667	1.79	0.00	0.067	0 I					1.29
0.833	1.84	0.00	0.092	0 I					1.62
1.000	1.96	0.00	0.118	0 I					1.92
1.167	2.13	0.00	0.146	0 I					2.23
1.333	2.18	0.00	0.176	0 I					2.55
1.500	2.18	0.00	0.206	0 I					2.85
1.667	2.18	0.00	0.236	0 I					3.15
1.833	2.18	0.00	0.266	0 I					3.43
2.000	2.30	0.00	0.297	0 I					3.72
2.167	2.36	0.00	0.329	0 I					4.02
2.333	2.47	0.00	0.362	0 I					4.32
2.500	2.53	0.00	0.397	0 I					4.63

2.667	2.53	0.00	0.432	0	I						4.94
2.833	2.76	0.00	0.468	0	I						5.27
3.000	2.87	0.53	0.503	0	I						5.58
3.167	2.99	1.90	0.527	0	I						5.80
3.333	3.16	2.57	0.538		OI						5.90
3.500	3.57	3.02	0.546		OI						5.97
3.667	4.08	3.48	0.554		0 I						6.04
3.833	4.48	3.94	0.562		OI						6.12
4.000	4.82	4.34	0.569		OI						6.18
4.167	5.28	4.75	0.576		OI						6.25
4.333	5.91	5.23	0.584		OI						6.32
4.500	6.48	5.78	0.594		0 I						6.41
4.667	7.00	6.33	0.603		0 I						6.50
4.833	7.51	6.66	0.613		0 I						6.60
5.000	8.02	7.06	0.626		0 I						6.72
5.167	10.07	7.77	0.648		0	I					6.94
5.333	12.58	9.09	0.688			0	I				7.33
5.500	15.92	10.91	0.747				0	I			7.96
5.667	8.27	11.31	0.760			I	0				8.11
5.833	2.24	9.19	0.692	I		0					7.37
6.000	0.83	6.40	0.605	I	0						6.52
6.167	0.19	3.08	0.547	I	0						5.98
6.333	0.00	1.37	0.518	I 0							5.71
6.500	0.00	0.59	0.504	I 0							5.59
6.667	0.00	0.25	0.498	0							5.54
6.833	0.00	0.11	0.496	0							5.52
7.000	0.00	0.05	0.495	0							5.51
7.167	0.00	0.02	0.494	0							5.50
7.333	0.00	0.01	0.494	0							5.50
7.500	0.00	0.00	0.494	0							5.50
7.667	0.00	0.00	0.494	0							5.50
7.833	0.00	0.00	0.494	0							5.50

Remaining water in basin = 0.49 (Ac.Ft)

*****HYDROGRAPH DATA*****

Number of intervals = 47

Time interval = 10.0 (Min.)

Maximum/Peak flow rate = 11.311 (CFS)

Total volume = 1.595 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

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Process from Point/Station      1.000 to Point/Station      2.000
**** PRINT CURRENT HYDROGRAPH ****

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          P R I N T   O F   S T O R M
        R u n o f f       H y d r o g r a p h
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          Hydrograph in 10 Minute intervals (CFS)
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Time(h+m)	Volume(Ac.Ft)	Q(CFS)	0	2.8	5.7	8.5	11.3
0+10	0.0000	0.00	Q				
0+20	0.0000	0.00	Q				
0+30	0.0000	0.00	Q				
0+40	0.0000	0.00	Q				
0+50	0.0001	0.00	Q				
1+ 0	0.0001	0.00	Q				
1+10	0.0001	0.00	Q				
1+20	0.0001	0.00	Q				
1+30	0.0001	0.00	Q				
1+40	0.0001	0.00	Q				
1+50	0.0001	0.00	Q				
2+ 0	0.0002	0.00	Q				
2+10	0.0002	0.00	Q				
2+20	0.0002	0.00	Q				
2+30	0.0002	0.00	Q				
2+40	0.0002	0.00	Q				
2+50	0.0002	0.00	Q				
3+ 0	0.0075	0.53	VQ				
3+10	0.0337	1.90	V	Q			
3+20	0.0692	2.57	V	Q			
3+30	0.1108	3.02	V	Q			
3+40	0.1588	3.48	V	Q			
3+50	0.2130	3.94	V	Q			
4+ 0	0.2728	4.34	V	Q			
4+10	0.3382	4.75	V	Q			
4+20	0.4103	5.23	V	Q			
4+30	0.4899	5.78	V	Q			
4+40	0.5771	6.33	V	Q			
4+50	0.6688	6.66	V	Q			
5+ 0	0.7661	7.06	V	Q			
5+10	0.8731	7.77	V	Q			
5+20	0.9983	9.09	V	Q			
5+30	1.1486	10.91	V	Q			
5+40	1.3044	11.31	V	Q			
5+50	1.4310	9.19	V	Q			
6+ 0	1.5192	6.40	V	Q			

6+10	1.5616	3.08		Q				V
6+20	1.5805	1.37		Q				V
6+30	1.5886	0.59		Q				V
6+40	1.5921	0.25	Q					V
6+50	1.5935	0.11	Q					V
7+ 0	1.5942	0.05	Q					V
7+10	1.5945	0.02	Q					V
7+20	1.5946	0.01	Q					V
7+30	1.5946	0.00	Q					V
7+40	1.5946	0.00	Q					V
7+50	1.5946	0.00	Q					V

*****HYDROGRAPH DATA*****

Number of intervals = 47

Time interval = 10.0 (Min.)

Maximum/Peak flow rate = 11.311 (CFS)

Total volume = 1.595 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

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Process from Point/Station 1.000 to Point/Station 2.000

**** PRINT CURRENT HYDROGRAPH ****

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PRINT OF STORM
Runoff Hydrograph

Hydrograph in 10 Minute intervals (CFS)

Time(h+m) Volume(Ac.Ft) Q(CFS) 0 2.8 5.7 8.5 11.3

0+10	0.0000	0.00	Q				
0+20	0.0000	0.00	Q				
0+30	0.0000	0.00	Q				
0+40	0.0000	0.00	Q				
0+50	0.0001	0.00	Q				
1+ 0	0.0001	0.00	Q				
1+10	0.0001	0.00	Q				
1+20	0.0001	0.00	Q				
1+30	0.0001	0.00	Q				
1+40	0.0001	0.00	Q				
1+50	0.0001	0.00	Q				

2+ 0	0.0002	0.00	Q					
2+10	0.0002	0.00	Q					
2+20	0.0002	0.00	Q					
2+30	0.0002	0.00	Q					
2+40	0.0002	0.00	Q					
2+50	0.0002	0.00	Q					
3+ 0	0.0075	0.53	VQ					
3+10	0.0337	1.90	V	Q				
3+20	0.0692	2.57	V	Q				
3+30	0.1108	3.02	V	Q				
3+40	0.1588	3.48	V	Q	Q			
3+50	0.2130	3.94	V	Q	Q			
4+ 0	0.2728	4.34	V	Q	Q			
4+10	0.3382	4.75	V	Q	Q			
4+20	0.4103	5.23	V	Q	Q			
4+30	0.4899	5.78	V	Q	Q			
4+40	0.5771	6.33	V	Q	Q			
4+50	0.6688	6.66	V	Q	Q			
5+ 0	0.7661	7.06	V	Q	Q			
5+10	0.8731	7.77	V	Q	Q			
5+20	0.9983	9.09	V	Q	Q			
5+30	1.1486	10.91	V	Q	Q			
5+40	1.3044	11.31	V	Q	Q			
5+50	1.4310	9.19	V	Q	Q			
6+ 0	1.5192	6.40	V	Q	Q			
6+10	1.5616	3.08	V	Q	Q			
6+20	1.5805	1.37	V	Q	Q			
6+30	1.5886	0.59	V	Q	Q			
6+40	1.5921	0.25	V	Q	Q			
6+50	1.5935	0.11	V	Q	Q			
7+ 0	1.5942	0.05	V	Q	Q			
7+10	1.5945	0.02	V	Q	Q			
7+20	1.5946	0.01	V	Q	Q			
7+30	1.5946	0.00	V	Q	Q			
7+40	1.5946	0.00	V	Q	Q			
7+50	1.5946	0.00	V	Q	Q			

*****HYDROGRAPH DATA*****

Number of intervals = 47

Time interval = 10.0 (Min.)

Maximum/Peak flow rate = 11.311 (CFS)

Total volume = 1.595 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** STORE OR DELETE CURRENT HYDROGRAPH ****

Current stream hydrograph saved in file 3100.rte

*****HYDROGRAPH DATA*****

 Number of intervals = 0
 Time interval = 0.0 (Min.)
 Maximum/Peak flow rate = 0.000 (CFS)
 Total volume = 0.000 (Ac.Ft)
Status of hydrographs being held in storage
 Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014
Study date: 10/22/20

ROUTED 24 HOUR 100 YEAR STORM

Program License Serial Number 6387

***** HYDROGRAPH INFORMATION *****

From study/file name: boulders224100.rte
*****HYDROGRAPH DATA*****
Number of intervals = 97
Time interval = 15.0 (Min.)
Maximum/Peak flow rate = 6.433 (CFS)
Total volume = 3.478 (Ac.Ft)
Status of hydrographs being held in storage
Stream 1 Stream 2 Stream 3 Stream 4 Stream 5
Peak (CFS) 0.000 0.000 0.000 0.000 0.000
Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
Process from Point/Station 1.000 to Point/Station 2.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 97
Hydrograph time unit = 15.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)

Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.500	0.016	0.001	0.016	0.016
1.000	0.046	0.001	0.046	0.046
1.500	0.082	0.001	0.082	0.082
2.000	0.125	0.001	0.125	0.125
2.500	0.171	0.001	0.171	0.171
3.000	0.221	0.001	0.221	0.221
3.500	0.273	0.001	0.273	0.273
4.000	0.327	0.001	0.327	0.327
4.500	0.382	0.001	0.382	0.382
5.000	0.438	0.001	0.438	0.438
5.500	0.494	0.000	0.494	0.494
6.000	0.549	3.200	0.516	0.582
6.500	0.603	6.330	0.538	0.668
7.000	0.655	7.980	0.573	0.737
7.500	0.705	9.640	0.605	0.805
8.000	0.751	11.040	0.637	0.865
8.500	0.794	12.280	0.667	0.921
9.000	0.831	13.400	0.693	0.969
9.500	0.860	14.430	0.711	1.009

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)						Depth (Ft.)
0.250	0.22	0.00	0.002	0I	1.6	3.22	4.82	6.43	0.07
0.500	0.40	0.00	0.009	0I					0.27
0.750	0.43	0.00	0.017	0 I					0.52
1.000	0.54	0.00	0.027	0 I					0.69
1.250	0.46	0.00	0.037	0 I					0.86
1.500	0.43	0.00	0.047	0 I					1.01
1.750	0.43	0.00	0.055	0 I					1.13
2.000	0.54	0.00	0.065	0 I					1.27
2.250	0.57	0.00	0.077	0 I					1.43
2.500	0.57	0.00	0.088	0 I					1.58
2.750	0.68	0.00	0.101	0 I					1.73
3.000	0.71	0.00	0.116	0 I					1.89
3.250	0.71	0.00	0.130	0 I					2.06
3.500	0.71	0.00	0.145	0 I					2.22
3.750	0.71	0.00	0.160	0 I					2.38

4.000	0.82	0.00	0.176	0	I						2.55	
4.250	0.85	0.00	0.193	0	I						2.72	
4.500	0.97	0.00	0.212	0	I						2.91	
4.750	1.00	0.00	0.232	0	I						3.11	
5.000	1.11	0.00	0.254	0	I						3.31	
5.250	0.92	0.00	0.275	0	I						3.51	
5.500	0.97	0.00	0.294	0	I						3.69	
5.750	1.11	0.00	0.315	0	I						3.89	
6.000	1.14	0.00	0.339	0	I						4.11	
6.250	1.25	0.00	0.363	0	I						4.33	
6.500	1.28	0.00	0.389	0	I						4.57	
6.750	1.39	0.00	0.417	0	I						4.81	
7.000	1.42	0.00	0.446	0	I						5.07	
7.250	1.42	0.00	0.476	0	I						5.33	
7.500	1.54	0.44	0.502	0	I						5.57	
7.750	1.72	1.33	0.517		0 I						5.71	
8.000	1.93	1.70	0.523			OI					5.77	
8.250	2.30	2.02	0.529				OI				5.81	
8.500	2.40	2.27	0.533				0				5.85	
8.750	2.57	2.43	0.536				0				5.88	
9.000	2.78	2.62	0.539				0				5.91	
9.250	3.15	2.88	0.544					OI			5.95	
9.500	3.41	3.18	0.549						OI		6.00	
9.750	3.62	3.43	0.553							OI	6.04	
10.000	3.83	3.65	0.557							OI	6.07	
10.250	2.77	3.39	0.552				I	0			6.03	
10.500	2.47	2.82	0.542				I	0			5.94	
10.750	3.28	2.86	0.543					0	I		5.95	
11.000	3.51	3.26	0.550						OI		6.01	
11.250	3.36	3.39	0.552						0		6.03	
11.500	3.32	3.35	0.552						0		6.02	
11.750	3.01	3.21	0.549					IO			6.00	
12.000	3.09	3.09	0.547					0			5.98	
12.250	4.25	3.52	0.555					0	I		6.05	
12.500	4.73	4.25	0.567						0	I	6.17	
12.750	5.10	4.75	0.576							0 I	6.25	
13.000	5.36	5.11	0.582							OI	6.30	
13.250	6.20	5.61	0.591							0	I	6.39
13.500	6.43	6.14	0.600								0 I	6.47
13.750	4.69	5.71	0.592						I		0	6.40
14.000	4.21	4.77	0.576						I	0		6.25
14.250	4.85	4.59	0.573							0	I	6.22
14.500	4.88	4.80	0.577								OI	6.26
14.750	4.84	4.84	0.577								0	6.26
15.000	4.69	4.78	0.576								0	6.25
15.250	4.49	4.64	0.574							IO		6.23
15.500	4.30	4.46	0.571							IO		6.20
15.750	3.62	4.08	0.564						I	0		6.14
16.000	3.45	3.67	0.557						IO			6.08
16.250	1.20	2.66	0.540		I		0					5.92

16.500	0.57	1.33	0.517	I	0					5.71
16.750	0.46	0.72	0.506	IO						5.61
17.000	0.43	0.51	0.503	O						5.58
17.250	0.65	0.53	0.503	OI						5.58
17.500	0.71	0.64	0.505	O						5.60
17.750	0.71	0.69	0.506	O						5.61
18.000	0.60	0.67	0.505	IO						5.60
18.250	0.57	0.61	0.504	IO						5.59
18.500	0.57	0.58	0.504	O						5.59
18.750	0.46	0.53	0.503	O						5.58
19.000	0.32	0.42	0.501	IO						5.57
19.250	0.40	0.37	0.500	O						5.56
19.500	0.54	0.44	0.502	O						5.57
19.750	0.46	0.48	0.502	O						5.58
20.000	0.32	0.41	0.501	IO						5.56
20.250	0.40	0.37	0.500	O						5.56
20.500	0.43	0.40	0.501	OI						5.56
20.750	0.43	0.42	0.501	O						5.57
21.000	0.32	0.38	0.501	O						5.56
21.250	0.40	0.36	0.500	O						5.56
21.500	0.32	0.36	0.500	O						5.56
21.750	0.40	0.36	0.500	O						5.56
22.000	0.32	0.36	0.500	O						5.56
22.250	0.40	0.36	0.500	O						5.56
22.500	0.32	0.36	0.500	O						5.56
22.750	0.28	0.31	0.499	O						5.55
23.000	0.28	0.29	0.499	O						5.55
23.250	0.28	0.29	0.499	O						5.54
23.500	0.28	0.29	0.499	O						5.54
23.750	0.28	0.28	0.499	O						5.54
24.000	0.28	0.28	0.499	O						5.54
24.250	0.06	0.20	0.497	IO						5.53
24.500	0.00	0.07	0.495	O						5.51
24.750	0.00	0.02	0.494	O						5.50
25.000	0.00	0.00	0.494	O						5.50
25.250	0.00	0.00	0.494	O						5.50
25.500	0.00	0.00	0.494	O						5.50

Remaining water in basin = 0.49 (Ac.Ft)

*****HYDROGRAPH DATA*****

Number of intervals = 102

Time interval = 15.0 (Min.)

Maximum/Peak flow rate = 6.140 (CFS)

Total volume = 2.984 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++
 Process from Point/Station 1.000 to Point/Station 2.000
 **** PRINT CURRENT HYDROGRAPH ****

+++++

PRINT OF STORM
 Runoff Hydrograph

Hydrograph in 15 Minute intervals (CFS)

Time(h+m)	Volume(Ac.Ft)	Q(CFS)	0	1.5	3.1	4.6	6.1
0+15	0.0000	0.00	Q				
0+30	0.0000	0.00	Q				
0+45	0.0000	0.00	Q				
1+ 0	0.0001	0.00	Q				
1+15	0.0001	0.00	Q				
1+30	0.0001	0.00	Q				
1+45	0.0001	0.00	Q				
2+ 0	0.0001	0.00	Q				
2+15	0.0002	0.00	Q				
2+30	0.0002	0.00	Q				
2+45	0.0002	0.00	Q				
3+ 0	0.0002	0.00	Q				
3+15	0.0002	0.00	Q				
3+30	0.0003	0.00	Q				
3+45	0.0003	0.00	Q				
4+ 0	0.0003	0.00	Q				
4+15	0.0003	0.00	Q				
4+30	0.0003	0.00	Q				
4+45	0.0004	0.00	Q				
5+ 0	0.0004	0.00	Q				
5+15	0.0004	0.00	Q				
5+30	0.0004	0.00	Q				
5+45	0.0004	0.00	Q				
6+ 0	0.0005	0.00	Q				
6+15	0.0005	0.00	Q				
6+30	0.0005	0.00	Q				
6+45	0.0005	0.00	Q				
7+ 0	0.0005	0.00	Q				
7+15	0.0006	0.00	Q				
7+30	0.0096	0.44	V Q				
7+45	0.0371	1.33	V	Q			

8+ 0	0.0723	1.70	V	Q				
8+15	0.1140	2.02	V	Q				
8+30	0.1609	2.27	V	Q				
8+45	0.2111	2.43	V	Q				
9+ 0	0.2651	2.62	V	Q				
9+15	0.3247	2.88	V	Q				
9+30	0.3904	3.18	V	Q				
9+45	0.4613	3.43	V	Q				
10+ 0	0.5368	3.65	V	Q				
10+15	0.6069	3.39	V	Q				
10+30	0.6651	2.82	V	Q				
10+45	0.7242	2.86	V	Q				
11+ 0	0.7915	3.26	V	Q				
11+15	0.8615	3.39	V	Q				
11+30	0.9307	3.35	V	Q				
11+45	0.9971	3.21	V	Q				
12+ 0	1.0609	3.09	V	Q				
12+15	1.1337	3.52	V	Q				
12+30	1.2215	4.25	V	Q				
12+45	1.3196	4.75	V	Q				
13+ 0	1.4251	5.11	V	Q				
13+15	1.5411	5.61	V	Q				
13+30	1.6679	6.14	V	Q				
13+45	1.7859	5.71	V	Q				
14+ 0	1.8843	4.77	V	Q				
14+15	1.9792	4.59	V	Q				
14+30	2.0783	4.80	V	Q				
14+45	2.1783	4.84	V	Q				
15+ 0	2.2772	4.78	V	Q				
15+15	2.3730	4.64	V	Q				
15+30	2.4651	4.46	V	Q				
15+45	2.5495	4.08	V	Q				
16+ 0	2.6253	3.67	V	Q				
16+15	2.6803	2.66	V	Q				
16+30	2.7078	1.33	V	Q				
16+45	2.7226	0.72	V	Q				
17+ 0	2.7331	0.51	V	Q				
17+15	2.7441	0.53	V	Q				
17+30	2.7574	0.64	V	Q				
17+45	2.7718	0.69	V	Q				
18+ 0	2.7855	0.67	V	Q				
18+15	2.7980	0.61	V	Q				
18+30	2.8100	0.58	V	Q				
18+45	2.8209	0.53	V	Q				
19+ 0	2.8297	0.42	V	Q				
19+15	2.8374	0.37	V	Q				
19+30	2.8465	0.44	V	Q				
19+45	2.8565	0.48	V	Q				
20+ 0	2.8650	0.41	V	Q				
20+15	2.8727	0.37	V	Q				

20+30	2.8810	0.40	Q				V
20+45	2.8897	0.42	Q				V
21+ 0	2.8976	0.38	Q				V
21+15	2.9051	0.36	Q				V
21+30	2.9125	0.36	Q				V
21+45	2.9198	0.36	Q				V
22+ 0	2.9272	0.36	Q				V
22+15	2.9345	0.36	Q				V
22+30	2.9419	0.36	Q				V
22+45	2.9484	0.31	Q				V
23+ 0	2.9544	0.29	Q				V
23+15	2.9604	0.29	Q				V
23+30	2.9662	0.29	Q				V
23+45	2.9721	0.28	Q				V
24+ 0	2.9780	0.28	Q				V
24+15	2.9822	0.20	Q				V
24+30	2.9837	0.07	Q				V
24+45	2.9841	0.02	Q				V
25+ 0	2.9842	0.00	Q				V
25+15	2.9842	0.00	Q				V
25+30	2.9842	0.00	Q				V

*****HYDROGRAPH DATA*****

Number of intervals = 102

Time interval = 15.0 (Min.)

Maximum/Peak flow rate = 6.140 (CFS)

Total volume = 2.984 (Ac.Ft)

Status of hydrographs being held in storage

Stream 1 Stream 2 Stream 3 Stream 4 Stream 5

Peak (CFS) 0.000 0.000 0.000 0.000 0.000

Vol (Ac.Ft) 0.000 0.000 0.000 0.000 0.000

+++++

Process from Point/Station 1.000 to Point/Station 2.000

**** PRINT CURRENT HYDROGRAPH ****

+++++

PRINT OF STORM
Runoff Hydrograph

Hydrograph in 15 Minute intervals (CFS)

Time(h+m) Volume(Ac.Ft) Q(CFS) 0 1.5 3.1 4.6 6.1

0+15	0.0000	0.00	Q				
------	--------	------	---	--	--	--	--

0+30	0.0000	0.00	Q					
0+45	0.0000	0.00	Q					
1+ 0	0.0001	0.00	Q					
1+15	0.0001	0.00	Q					
1+30	0.0001	0.00	Q					
1+45	0.0001	0.00	Q					
2+ 0	0.0001	0.00	Q					
2+15	0.0002	0.00	Q					
2+30	0.0002	0.00	Q					
2+45	0.0002	0.00	Q					
3+ 0	0.0002	0.00	Q					
3+15	0.0002	0.00	Q					
3+30	0.0003	0.00	Q					
3+45	0.0003	0.00	Q					
4+ 0	0.0003	0.00	Q					
4+15	0.0003	0.00	Q					
4+30	0.0003	0.00	Q					
4+45	0.0004	0.00	Q					
5+ 0	0.0004	0.00	Q					
5+15	0.0004	0.00	Q					
5+30	0.0004	0.00	Q					
5+45	0.0004	0.00	Q					
6+ 0	0.0005	0.00	Q					
6+15	0.0005	0.00	Q					
6+30	0.0005	0.00	Q					
6+45	0.0005	0.00	Q					
7+ 0	0.0005	0.00	Q					
7+15	0.0006	0.00	Q					
7+30	0.0096	0.44	V Q					
7+45	0.0371	1.33	V	Q				
8+ 0	0.0723	1.70	V		Q			
8+15	0.1140	2.02	V		Q	Q		
8+30	0.1609	2.27	V			Q	Q	
8+45	0.2111	2.43	V				Q	
9+ 0	0.2651	2.62	V				Q	
9+15	0.3247	2.88	V				Q	
9+30	0.3904	3.18	V				Q	
9+45	0.4613	3.43	V				Q	Q
10+ 0	0.5368	3.65	V				Q	Q
10+15	0.6069	3.39	V				Q	
10+30	0.6651	2.82	V			Q		
10+45	0.7242	2.86	V			Q		
11+ 0	0.7915	3.26	V				Q	Q
11+15	0.8615	3.39	V				Q	
11+30	0.9307	3.35	V				Q	
11+45	0.9971	3.21	V				Q	
12+ 0	1.0609	3.09	V				Q	
12+15	1.1337	3.52	V				Q	
12+30	1.2215	4.25	V					Q
12+45	1.3196	4.75	V					Q

13+ 0	1.4251	5.11			v			Q	
13+15	1.5411	5.61			v			Q	
13+30	1.6679	6.14				v			Q
13+45	1.7859	5.71				v		Q	
14+ 0	1.8843	4.77					v		
14+15	1.9792	4.59					v	Q	
14+30	2.0783	4.80						Q	
14+45	2.1783	4.84					v	Q	
15+ 0	2.2772	4.78						vQ	
15+15	2.3730	4.64						QV	
15+30	2.4651	4.46					Q		
15+45	2.5495	4.08						v	
16+ 0	2.6253	3.67				Q		v	
16+15	2.6803	2.66			Q			v	
16+30	2.7078	1.33		Q				v	
16+45	2.7226	0.72	Q					v	
17+ 0	2.7331	0.51	Q					v	
17+15	2.7441	0.53	Q					v	
17+30	2.7574	0.64	Q					v	
17+45	2.7718	0.69	Q					v	
18+ 0	2.7855	0.67	Q					v	
18+15	2.7980	0.61	Q					v	
18+30	2.8100	0.58	Q					v	
18+45	2.8209	0.53	Q					v	
19+ 0	2.8297	0.42	Q					v	
19+15	2.8374	0.37	Q					v	
19+30	2.8465	0.44	Q					v	
19+45	2.8565	0.48	Q					v	
20+ 0	2.8650	0.41	Q					v	
20+15	2.8727	0.37	Q					v	
20+30	2.8810	0.40	Q					v	
20+45	2.8897	0.42	Q					v	
21+ 0	2.8976	0.38	Q					v	
21+15	2.9051	0.36	Q					v	
21+30	2.9125	0.36	Q					v	
21+45	2.9198	0.36	Q					v	
22+ 0	2.9272	0.36	Q					v	
22+15	2.9345	0.36	Q					v	
22+30	2.9419	0.36	Q					v	
22+45	2.9484	0.31	Q					v	
23+ 0	2.9544	0.29	Q					v	
23+15	2.9604	0.29	Q					v	
23+30	2.9662	0.29	Q					v	
23+45	2.9721	0.28	Q					v	
24+ 0	2.9780	0.28	Q					v	
24+15	2.9822	0.20	Q					v	
24+30	2.9837	0.07	Q					v	
24+45	2.9841	0.02	Q					v	
25+ 0	2.9842	0.00	Q					v	
25+15	2.9842	0.00	Q					v	

25+30 2.9842 0.00 Q | | | V

*****HYDROGRAPH DATA*****

Number of intervals = 102
Time interval = 15.0 (Min.)
Maximum/Peak flow rate = 6.140 (CFS)
Total volume = 2.984 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

+++++

Process from Point/Station 1.000 to Point/Station 2.000

**** STORE OR DELETE CURRENT HYDROGRAPH ****

Current stream hydrograph saved in file 3100.rte

*****HYDROGRAPH DATA*****

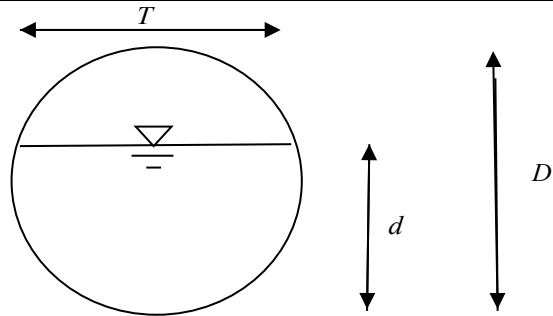
Number of intervals = 0
Time interval = 0.0 (Min.)
Maximum/Peak flow rate = 0.000 (CFS)
Total volume = 0.000 (Ac.Ft)

Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

Appendix C

HYDRAULIC PIPE COMPUTATIONS FOR 6" PVC



DIAMETER = 6 in. PVC

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_w} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.011	

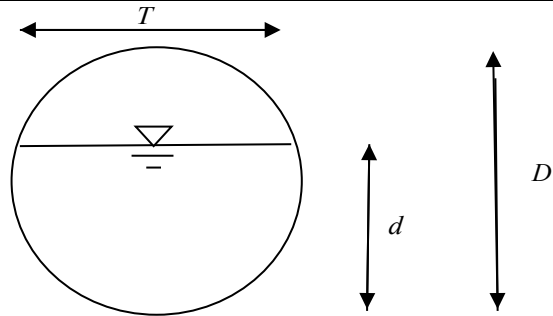
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_w	V	Froud	Q
ft	ft/ft	°	ft ²	ft	ft	ft ² /s	No.	ft ³ /s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.03	0.05	51.68	0.00	0.22	0.23	0.61	0.83	0.00
0.05	0.10	73.74	0.01	0.30	0.32	0.96	0.91	0.01
0.08	0.15	91.15	0.02	0.36	0.40	1.23	0.96	0.02
0.10	0.20	106.26	0.03	0.40	0.46	1.47	0.98	0.04
0.13	0.25	120.00	0.04	0.43	0.52	1.67	0.99	0.06
0.15	0.30	132.84	0.05	0.46	0.58	1.85	0.99	0.09
0.18	0.35	145.08	0.06	0.48	0.63	2.01	0.99	0.12
0.20	0.40	156.93	0.07	0.49	0.68	2.15	0.98	0.16
0.23	0.45	168.52	0.09	0.50	0.74	2.28	0.97	0.20
0.25	0.50	180.00	0.10	0.50	0.79	2.39	0.95	0.23
0.28	0.55	191.48	0.11	0.50	0.84	2.48	0.93	0.27
0.30	0.60	203.07	0.12	0.49	0.89	2.56	0.90	0.32
0.33	0.65	214.92	0.14	0.48	0.94	2.63	0.87	0.35
0.35	0.70	227.16	0.15	0.46	0.99	2.67	0.83	0.39
0.38	0.75	240.00	0.16	0.43	1.05	2.71	0.79	0.43
0.40	0.80	253.74	0.17	0.40	1.11	2.72	0.74	0.46
0.43	0.85	268.85	0.18	0.36	1.17	2.72	0.68	0.48
0.45	0.90	286.26	0.19	0.30	1.25	2.68	0.60	0.50
0.48	0.95	308.32	0.19	0.22	1.35	2.61	0.49	0.50
0.50	1.00	360.00	0.20	0.00	1.57	2.39	∞	0.47

Critical Depth	0.36	ft
Maximum Discharge	0.50	ft ³ /s

Completed by:	JHJ
Checked by:	JHJ
Date:	6/14/2020
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 8" PVC



DIAMETER = 8 in. PVC

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_w} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.011	

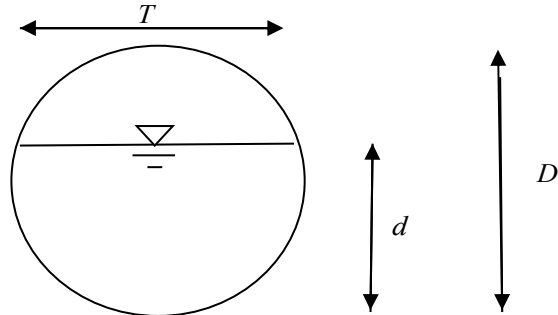
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_w	V	Froud	Q
ft	ft/ft	°	ft ²	ft	ft	ft ² /s	No.	ft ³ /s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.03	0.05	51.68	0.01	0.29	0.30	0.74	0.87	0.00
0.07	0.10	73.74	0.02	0.40	0.43	1.16	0.96	0.02
0.10	0.15	91.15	0.03	0.48	0.53	1.50	1.00	0.05
0.13	0.20	106.26	0.05	0.53	0.62	1.78	1.03	0.09
0.17	0.25	120.00	0.07	0.58	0.70	2.03	1.04	0.14
0.20	0.30	132.84	0.09	0.61	0.77	2.25	1.04	0.20
0.23	0.35	145.08	0.11	0.64	0.84	2.44	1.04	0.27
0.27	0.40	156.93	0.13	0.65	0.91	2.61	1.03	0.34
0.30	0.45	168.52	0.15	0.66	0.98	2.76	1.02	0.42
0.33	0.50	180.00	0.17	0.67	1.05	2.89	1.00	0.50
0.37	0.55	191.48	0.20	0.66	1.11	3.01	0.97	0.59
0.40	0.60	203.07	0.22	0.65	1.18	3.10	0.94	0.68
0.43	0.65	214.92	0.24	0.64	1.25	3.18	0.91	0.76
0.47	0.70	227.16	0.26	0.61	1.32	3.24	0.87	0.85
0.50	0.75	240.00	0.28	0.58	1.40	3.28	0.83	0.92
0.53	0.80	253.74	0.30	0.53	1.48	3.30	0.78	0.99
0.57	0.85	268.85	0.32	0.48	1.56	3.29	0.71	1.04
0.60	0.90	286.26	0.33	0.40	1.67	3.25	0.63	1.08
0.63	0.95	308.32	0.34	0.29	1.79	3.17	0.51	1.09
0.67	1.00	360.00	0.35	0.00	2.09	2.89	∞	1.01

Critical Depth	0.49	ft
Maximum Discharge	1.09	ft ³ /s

Completed by:	JHJ
Checked by:	JHJ
Date:	10/20/2019
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 8" PVC @ 1% Slope



DIAMETER = 8 in. PVC

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.01	ft/ft
n	0.011	

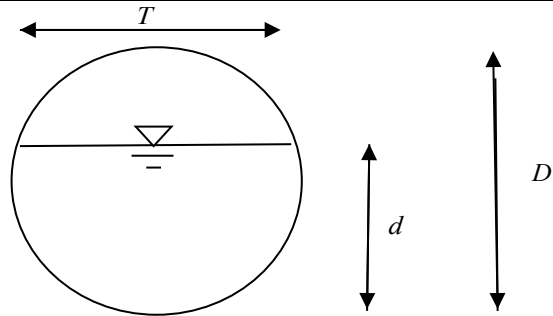
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_w	V	Froud No.	Q
ft	ft/ft	°	ft ²	ft	ft	ft ² /s		ft ³ /s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.03	0.05	51.68	0.01	0.29	0.30	1.05	1.24	0.01
0.07	0.10	73.74	0.02	0.40	0.43	1.64	1.36	0.03
0.10	0.15	91.15	0.03	0.48	0.53	2.11	1.42	0.07
0.13	0.20	106.26	0.05	0.53	0.62	2.52	1.45	0.13
0.17	0.25	120.00	0.07	0.58	0.70	2.87	1.47	0.20
0.20	0.30	132.84	0.09	0.61	0.77	3.18	1.47	0.28
0.23	0.35	145.08	0.11	0.64	0.84	3.45	1.47	0.38
0.27	0.40	156.93	0.13	0.65	0.91	3.69	1.46	0.48
0.30	0.45	168.52	0.15	0.66	0.98	3.90	1.44	0.59
0.33	0.50	180.00	0.17	0.67	1.05	4.09	1.41	0.71
0.37	0.55	191.48	0.20	0.66	1.11	4.25	1.38	0.84
0.40	0.60	203.07	0.22	0.65	1.18	4.39	1.34	0.96
0.43	0.65	214.92	0.24	0.64	1.25	4.50	1.29	1.08
0.47	0.70	227.16	0.26	0.61	1.32	4.58	1.24	1.20
0.50	0.75	240.00	0.28	0.58	1.40	4.64	1.17	1.30
0.53	0.80	253.74	0.30	0.53	1.48	4.66	1.10	1.40
0.57	0.85	268.85	0.32	0.48	1.56	4.65	1.01	1.47
0.60	0.90	286.26	0.33	0.40	1.67	4.60	0.89	1.52
0.63	0.95	308.32	0.34	0.29	1.79	4.48	0.73	1.53
0.67	1.00	360.00	0.35	0.00	2.09	4.09	∞	1.43

Critical Depth	0.56	ft
Maximum Discharge	1.54	ft ³ /s

Completed by:	JHJ
Checked by:	JHJ
Date:	10/25/2020
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 10" PVC



DIAMETER = 10 in. PVC

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_w} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.011	

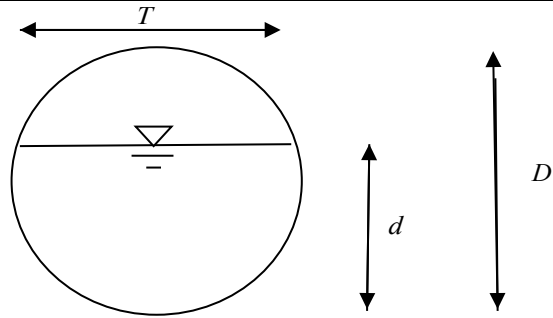
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_w	V	Froud	Q
ft	ft/ft	°	ft ²	ft	ft	ft ² /s	No.	ft ³ /s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.04	0.05	51.68	0.01	0.36	0.38	0.86	0.91	0.01
0.08	0.10	73.74	0.03	0.50	0.54	1.35	1.00	0.04
0.13	0.15	91.15	0.05	0.60	0.66	1.73	1.04	0.09
0.17	0.20	106.26	0.08	0.67	0.77	2.06	1.07	0.16
0.21	0.25	120.00	0.11	0.72	0.87	2.35	1.08	0.25
0.25	0.30	132.84	0.14	0.76	0.97	2.61	1.08	0.36
0.29	0.35	145.08	0.17	0.79	1.06	2.83	1.08	0.48
0.33	0.40	156.93	0.20	0.82	1.14	3.03	1.07	0.62
0.38	0.45	168.52	0.24	0.83	1.23	3.20	1.05	0.76
0.42	0.50	180.00	0.27	0.83	1.31	3.36	1.03	0.92
0.46	0.55	191.48	0.31	0.83	1.39	3.49	1.01	1.07
0.50	0.60	203.07	0.34	0.82	1.48	3.60	0.98	1.23
0.54	0.65	214.92	0.38	0.79	1.56	3.69	0.95	1.38
0.58	0.70	227.16	0.41	0.76	1.65	3.76	0.91	1.53
0.63	0.75	240.00	0.44	0.72	1.75	3.81	0.86	1.67
0.67	0.80	253.74	0.47	0.67	1.85	3.83	0.80	1.79
0.71	0.85	268.85	0.49	0.60	1.96	3.82	0.74	1.89
0.75	0.90	286.26	0.52	0.50	2.08	3.77	0.65	1.95
0.79	0.95	308.32	0.54	0.36	2.24	3.68	0.53	1.97
0.83	1.00	360.00	0.55	0.00	2.62	3.36	∞	1.83

Critical Depth	0.62	ft
Maximum Discharge	1.97	ft ³ /s

Completed by:	JHJ
Checked by:	JHJ
Date:	10/20/2019
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 12" PVC



DIAMETER = 12 in. PVC

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_w} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.011	

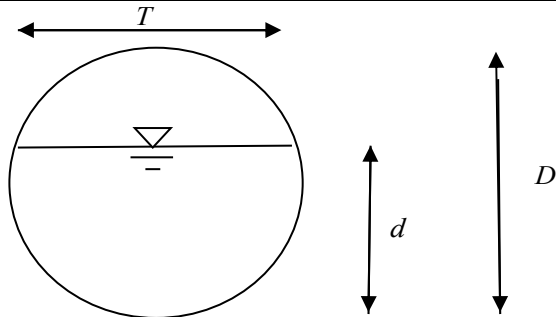
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_w	V	Froud	Q
ft	ft/ft	°	ft ²	ft	ft	ft ² /s	No.	ft ³ /s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	0.05	51.68	0.01	0.44	0.45	0.97	0.94	0.01
0.10	0.10	73.74	0.04	0.60	0.64	1.52	1.03	0.06
0.15	0.15	91.15	0.07	0.71	0.80	1.96	1.07	0.14
0.20	0.20	106.26	0.11	0.80	0.93	2.33	1.10	0.26
0.25	0.25	120.00	0.15	0.87	1.05	2.66	1.11	0.41
0.30	0.30	132.84	0.20	0.92	1.16	2.94	1.12	0.58
0.35	0.35	145.08	0.24	0.95	1.27	3.20	1.11	0.78
0.40	0.40	156.93	0.29	0.98	1.37	3.42	1.10	1.00
0.45	0.45	168.52	0.34	0.99	1.47	3.62	1.09	1.24
0.50	0.50	180.00	0.39	1.00	1.57	3.79	1.07	1.49
0.55	0.55	191.48	0.44	0.99	1.67	3.94	1.04	1.74
0.60	0.60	203.07	0.49	0.98	1.77	4.07	1.01	2.00
0.65	0.65	214.92	0.54	0.95	1.88	4.17	0.98	2.25
0.70	0.70	227.16	0.59	0.92	1.98	4.24	0.93	2.49
0.75	0.75	240.00	0.63	0.87	2.09	4.30	0.89	2.71
0.80	0.80	253.74	0.67	0.80	2.21	4.32	0.83	2.91
0.85	0.85	268.85	0.71	0.71	2.35	4.31	0.76	3.07
0.90	0.90	286.26	0.74	0.60	2.50	4.26	0.67	3.17
0.95	0.95	308.32	0.77	0.44	2.69	4.15	0.55	3.20
1.00	1.00	360.00	0.79	0.00	3.14	3.79	∞	2.98

Critical Depth	0.75	ft
Maximum Discharge	3.20	ft ³ /s

Completed by:	JHJ
Checked by:	JHJ
Date:	10/20/2019
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 12" PVC @ 1% Slope



DIAMETER = 12 in. PVC

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.01	ft/ft
n	0.011	

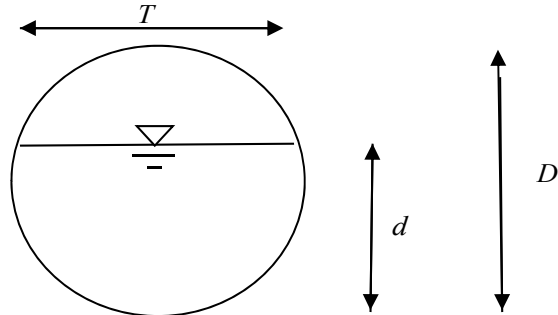
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_w	V	Froud No.	Q
ft	ft/ft	°	ft ²	ft	ft	ft ² /s		ft ³ /s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.05	0.05	51.68	0.01	0.44	0.45	1.38	1.32	0.02
0.10	0.10	73.74	0.04	0.60	0.64	2.15	1.45	0.09
0.15	0.15	91.15	0.07	0.71	0.80	2.77	1.52	0.20
0.20	0.20	106.26	0.11	0.80	0.93	3.30	1.55	0.37
0.25	0.25	120.00	0.15	0.87	1.05	3.76	1.57	0.58
0.30	0.30	132.84	0.20	0.92	1.16	4.16	1.58	0.82
0.35	0.35	145.08	0.24	0.95	1.27	4.52	1.57	1.11
0.40	0.40	156.93	0.29	0.98	1.37	4.84	1.56	1.42
0.45	0.45	168.52	0.34	0.99	1.47	5.12	1.54	1.75
0.50	0.50	180.00	0.39	1.00	1.57	5.36	1.51	2.11
0.55	0.55	191.48	0.44	0.99	1.67	5.57	1.47	2.47
0.60	0.60	203.07	0.49	0.98	1.77	5.75	1.43	2.83
0.65	0.65	214.92	0.54	0.95	1.88	5.89	1.38	3.18
0.70	0.70	227.16	0.59	0.92	1.98	6.00	1.32	3.53
0.75	0.75	240.00	0.63	0.87	2.09	6.08	1.25	3.84
0.80	0.80	253.74	0.67	0.80	2.21	6.11	1.17	4.12
0.85	0.85	268.85	0.71	0.71	2.35	6.10	1.08	4.34
0.90	0.90	286.26	0.74	0.60	2.50	6.03	0.95	4.49
0.95	0.95	308.32	0.77	0.44	2.69	5.87	0.78	4.52
1.00	1.00	360.00	0.79	0.00	3.14	5.36	∞	4.21

Critical Depth	0.86	ft
Maximum Discharge	4.53	ft ³ /s

Completed by:	JHJ
Checked by:	JHJ
Date:	10/25/2020
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 18" RCP



DIAMETER = 18 in. RCP

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.011	

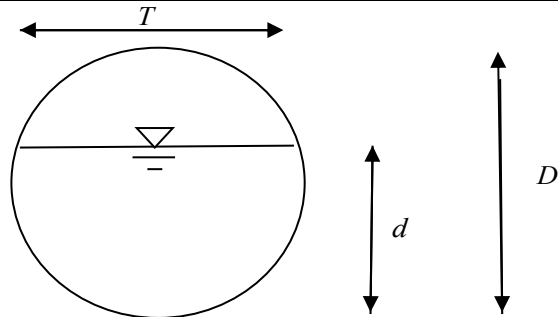
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_w	V	Froud No.	Q
ft	ft/ft	°	ft ²	ft	ft	ft ² /s		ft ³ /s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.08	0.05	51.68	0.03	0.65	0.68	1.28	1.00	0.04
0.15	0.10	73.74	0.09	0.90	0.97	1.99	1.10	0.18
0.23	0.15	91.15	0.17	1.07	1.19	2.57	1.15	0.43
0.30	0.20	106.26	0.25	1.20	1.39	3.06	1.18	0.77
0.38	0.25	120.00	0.35	1.30	1.57	3.48	1.19	1.20
0.45	0.30	132.84	0.45	1.37	1.74	3.86	1.19	1.72
0.53	0.35	145.08	0.55	1.43	1.90	4.19	1.19	2.31
0.60	0.40	156.93	0.66	1.47	2.05	4.48	1.18	2.96
0.68	0.45	168.52	0.77	1.49	2.21	4.74	1.16	3.66
0.75	0.50	180.00	0.88	1.50	2.36	4.97	1.14	4.39
0.83	0.55	191.48	1.00	1.49	2.51	5.16	1.11	5.14
0.90	0.60	203.07	1.11	1.47	2.66	5.33	1.08	5.90
0.98	0.65	214.92	1.22	1.43	2.81	5.46	1.04	6.64
1.05	0.70	227.16	1.32	1.37	2.97	5.56	1.00	7.35
1.13	0.75	240.00	1.42	1.30	3.14	5.63	0.95	8.00
1.20	0.80	253.74	1.52	1.20	3.32	5.66	0.89	8.58
1.28	0.85	268.85	1.60	1.07	3.52	5.65	0.81	9.05
1.35	0.90	286.26	1.68	0.90	3.75	5.58	0.72	9.36
1.43	0.95	308.32	1.73	0.65	4.04	5.44	0.59	9.43
1.50	1.00	360.00	1.77	0.00	4.71	4.97	∞	8.78

Critical Depth	1.15	ft
Maximum Discharge	9.44	ft ³ /s

Completed by:	JHJ
Checked by:	JHJ
Date:	6/10/2020
Sheet:	1 of 1

HYDRAULIC PIPE COMPUTATIONS FOR 18" RCP @ 2% Slope



DIAMETER = 18 in. RCP

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.02	ft/ft
n	0.011	

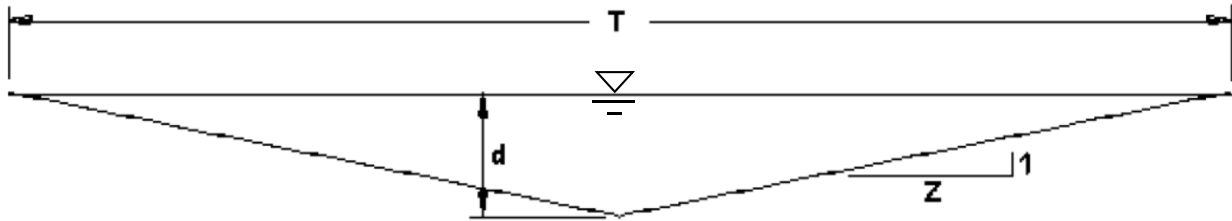
HYDRAULIC ELEMENTS FOR CIRCULAR CHANNEL

d	d/D	θ	A	T	P_w	V	Froud No.	Q
ft	ft/ft	°	ft ²	ft	ft	ft ² /s		ft ³ /s
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.08	0.05	51.68	0.03	0.65	0.68	2.55	2.00	0.08
0.15	0.10	73.74	0.09	0.90	0.97	3.99	2.20	0.37
0.23	0.15	91.15	0.17	1.07	1.19	5.13	2.30	0.85
0.30	0.20	106.26	0.25	1.20	1.39	6.11	2.35	1.54
0.38	0.25	120.00	0.35	1.30	1.57	6.96	2.38	2.40
0.45	0.30	132.84	0.45	1.37	1.74	7.71	2.39	3.44
0.53	0.35	145.08	0.55	1.43	1.90	8.37	2.38	4.62
0.60	0.40	156.93	0.66	1.47	2.05	8.96	2.36	5.92
0.68	0.45	168.52	0.77	1.49	2.21	9.48	2.32	7.31
0.75	0.50	180.00	0.88	1.50	2.36	9.93	2.28	8.78
0.83	0.55	191.48	1.00	1.49	2.51	10.33	2.23	10.28
0.90	0.60	203.07	1.11	1.47	2.66	10.65	2.16	11.80
0.98	0.65	214.92	1.22	1.43	2.81	10.92	2.09	13.28
1.05	0.70	227.16	1.32	1.37	2.97	11.12	2.00	14.70
1.13	0.75	240.00	1.42	1.30	3.14	11.26	1.90	16.01
1.20	0.80	253.74	1.52	1.20	3.32	11.32	1.78	17.16
1.28	0.85	268.85	1.60	1.07	3.52	11.30	1.63	18.09
1.35	0.90	286.26	1.68	0.90	3.75	11.17	1.44	18.71
1.43	0.95	308.32	1.73	0.65	4.04	10.88	1.18	18.86
1.50	1.00	360.00	1.77	0.00	4.71	9.94	∞	17.56

Critical Depth	1.52	ft
Maximum Discharge	18.89	ft ³ /s

Completed by:	JHJ
Checked by:	JHJ
Date:	10/25/2020
Sheet:	1 of 1

HYDRAULIC CALCULATIONS FOR RIBBON GUTTER



Z = 9 H:V

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.005	ft/ft
n	0.013	

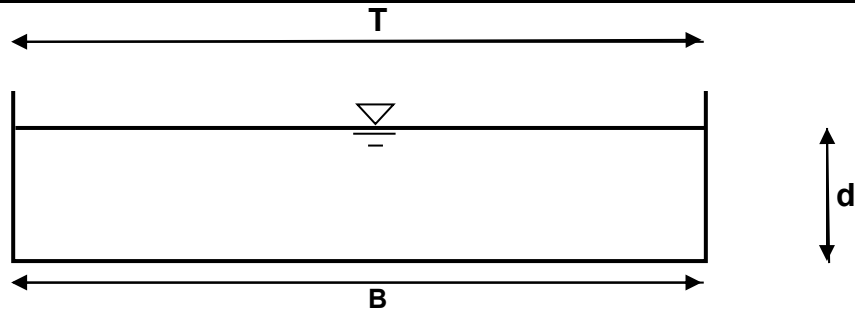
HYDRAULIC ELEMENTS OF TRAPEZOIDAL SECTION

d	A	T	P_w	V	Froud	Q
ft	ft ²	ft	ft	ft ² /s	No.	ft ³ /s
0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.10	0.09	1.80	1.81	1.09	0.86	0.10
0.20	0.36	3.60	3.62	1.73	0.97	0.62
0.30	0.81	5.40	5.43	2.27	1.03	1.84
0.40	1.44	7.20	7.24	2.75	1.08	3.96
0.50	2.25	9.00	9.06	3.19	1.13	7.19
0.60	3.24	10.80	10.87	3.61	1.16	11.69
0.70	4.41	12.60	12.68	4.00	1.19	17.63
0.80	5.76	14.40	14.49	4.37	1.22	25.17
0.90	7.29	16.20	16.30	4.73	1.24	34.46
1.00	9.00	18.00	18.11	5.07	1.26	45.64
1.10	10.89	19.80	19.92	5.40	1.28	58.85
1.20	12.96	21.60	21.73	5.73	1.30	74.21
1.30	15.21	23.40	23.54	6.04	1.32	91.87
1.40	17.64	25.20	25.36	6.35	1.34	111.95
1.50	20.25	27.00	27.17	6.64	1.35	134.56

Critical Depth 1.69 ft

Completed by:	JHJ
Checked by:	RD
Date:	6/30/2019
Sheet:	1 of 1

HYDRAULIC CALCULATIONS FOR PARKWAY DRAIN TO FOREBAYS



$$B = 3 \text{ ft}$$

$$Q = \frac{K_U}{n} A \left(\frac{A}{P_W} \right)^{2/3} (S_L)^{1/2}$$

K_U	1.486	
S_L	0.02	ft/ft
n	0.015	

HYDRAULIC ELEMENTS OF RECTANGULAR SECTION

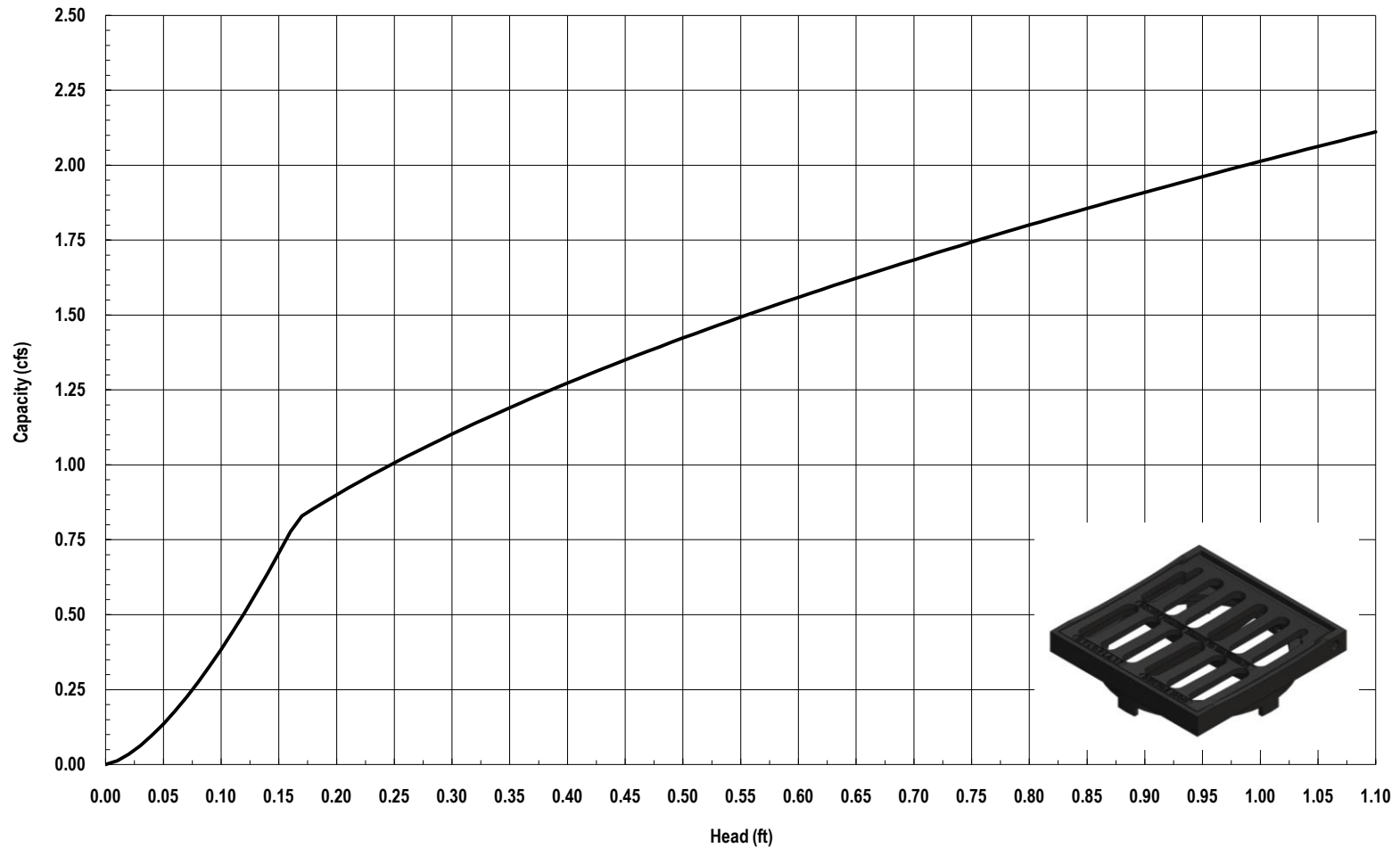
d	A	T	P _w	V	Froud	Q
ft	ft ²	ft	ft	ft ² /s	No.	ft ³ /s
0.00	0.00	3.00	3.00	0.00	0.00	0.00
0.25	0.75	3.00	3.50	5.02	1.77	3.76
0.50	1.50	3.00	4.00	7.29	1.82	10.93
0.75	2.25	3.00	4.50	8.83	1.80	19.86
1.00	3.00	3.00	5.00	9.97	1.76	29.90
1.25	3.75	3.00	5.50	10.85	1.71	40.70
1.50	4.50	3.00	6.00	11.57	1.66	52.04
1.75	5.25	3.00	6.50	12.15	1.62	63.79
2.00	6.00	3.00	7.00	12.64	1.58	75.85
2.25	6.75	3.00	7.50	13.06	1.53	88.15
2.50	7.50	3.00	8.00	13.42	1.50	100.65
2.75	8.25	3.00	8.50	13.73	1.46	113.31
3.00	9.00	3.00	9.00	14.01	1.43	126.09
3.25	9.75	3.00	9.50	14.25	1.39	138.98
3.50	10.50	3.00	10.00	14.47	1.36	151.97
3.75	11.25	3.00	10.50	14.67	1.33	165.03
4.00	12.00	3.00	11.00	14.85	1.31	178.16
4.25	12.75	3.00	11.50	15.01	1.28	191.35
4.50	13.50	3.00	12.00	15.15	1.26	204.59
4.75	14.25	3.00	12.50	15.29	1.24	217.87
5.00	15.00	3.00	13.00	15.41	1.21	231.19

MAX IS GREATER
THAN Q100

Critical Depth 5.692 ft

Completed by:	JHJ
Checked by:	FDG
Date:	10/25/2020
Sheet:	1 of 1

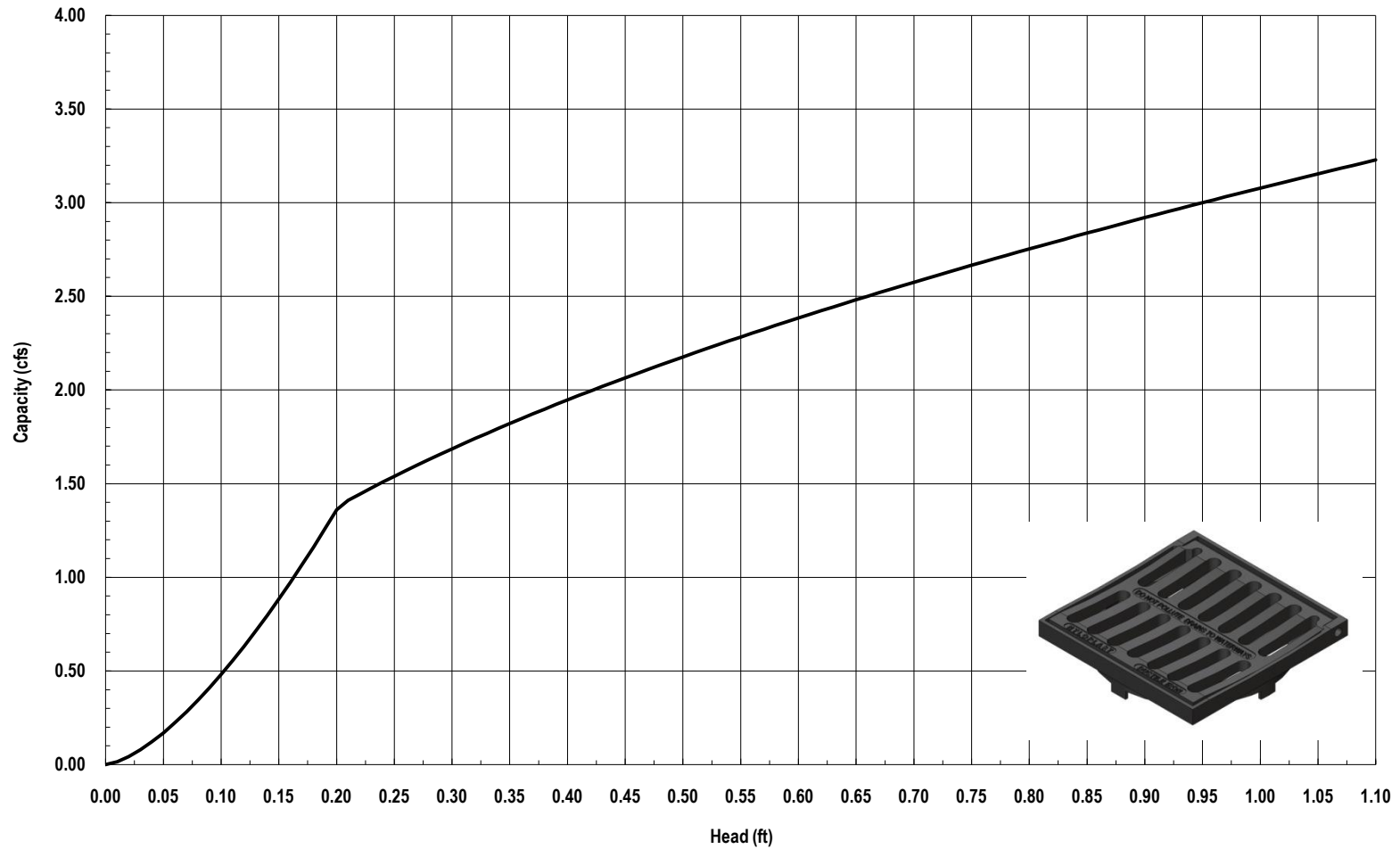
Nyloplast 12" Standard Grate Inlet Capacity Chart



Nyloplast[®]

3130 Verona Avenue • Buford, GA 30518
(866) 888-8479 / (770) 932-2443 • Fax: (770) 932-2490
© Nyloplast Inlet Capacity Charts June 2012

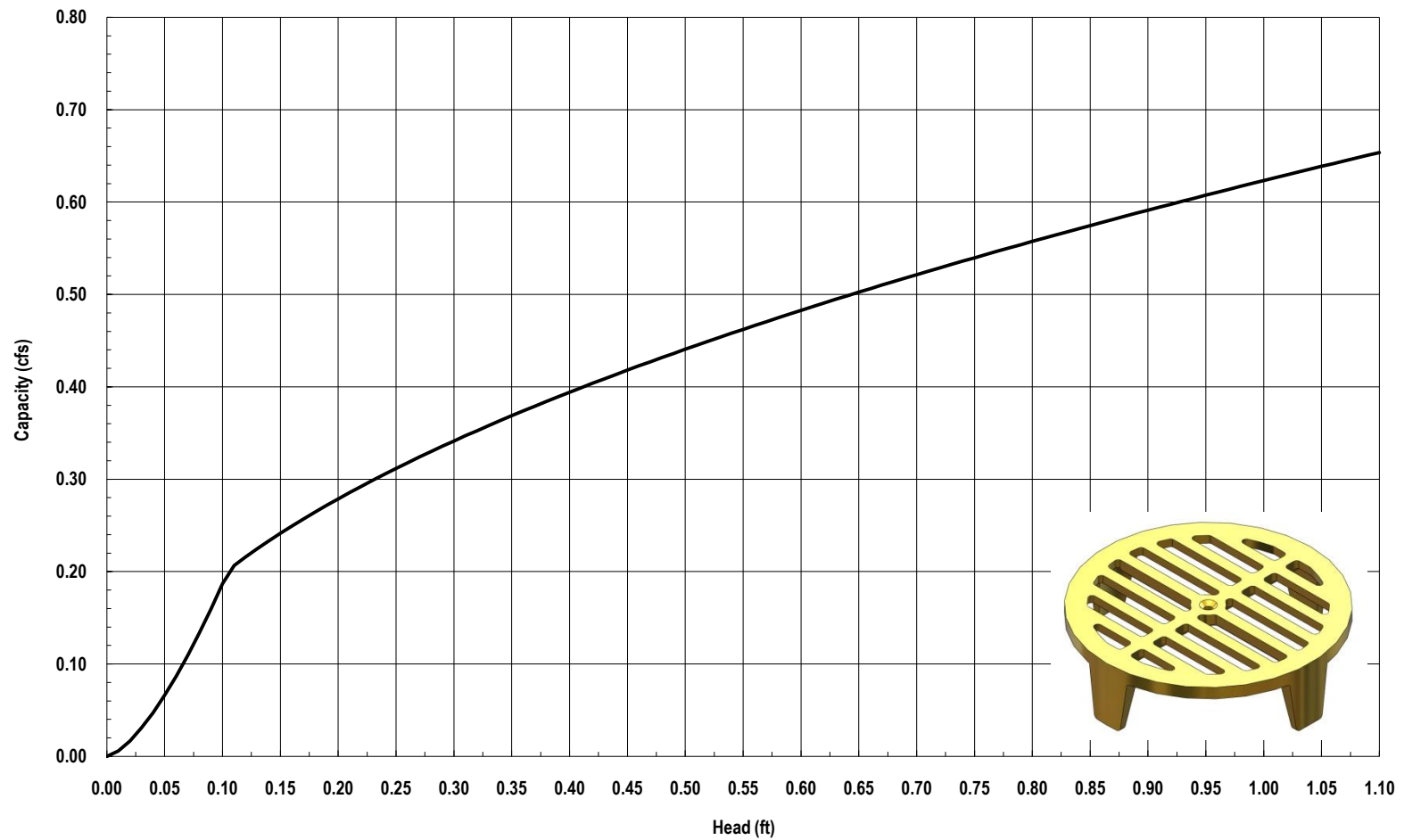
Nyloplast 15" Standard Grate Inlet Capacity Chart



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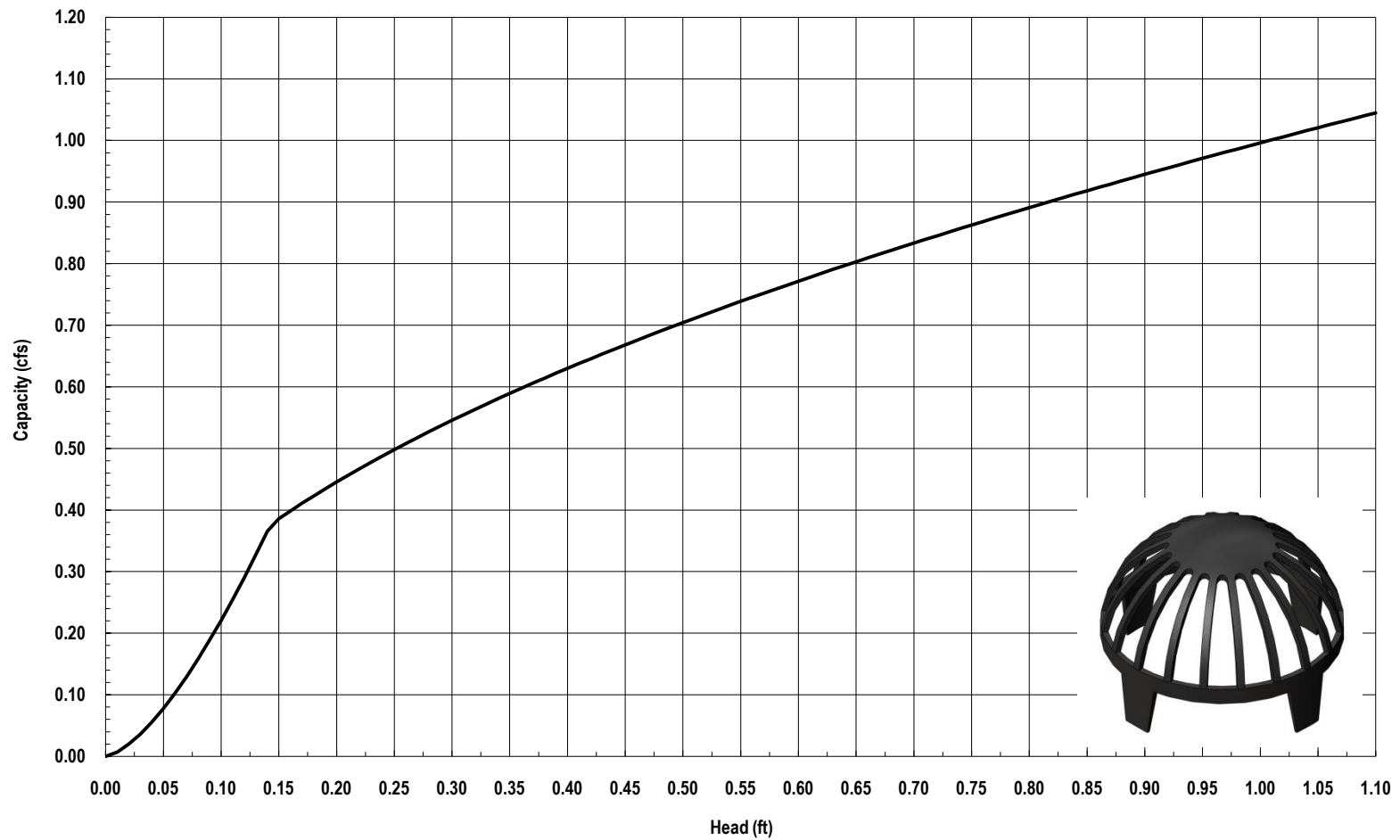
Nyloplast 8" Bronze Grate Inlet Capacity Chart



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Nyloplast 8" Dome Grate Inlet Capacity Chart



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Appendix D

NOAA Atlas 14, Volume 6, Version 2 SUN CITY

Station ID: 90-0212

Location name: Menifee, California, USA*

Latitude: 33.7153°, Longitude: -117.1903°

Elevation:

Elevation (station metadata): 1426 ft**

* source: ESRI Maps

** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

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

PF tabular

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	0.086 (0.072-0.104)	0.125 (0.104-0.151)	0.178 (0.148-0.215)	0.223 (0.184-0.272)	0.287 (0.229-0.364)	0.339 (0.265-0.439)	0.394 (0.300-0.523)	0.453 (0.335-0.620)	0.537 (0.380-0.767)	0.605 (0.413-0.896)
10-min	0.123 (0.103-0.149)	0.179 (0.150-0.216)	0.255 (0.213-0.309)	0.320 (0.264-0.391)	0.412 (0.329-0.521)	0.486 (0.380-0.629)	0.565 (0.430-0.750)	0.650 (0.480-0.888)	0.770 (0.545-1.10)	0.868 (0.592-1.29)
15-min	0.149 (0.125-0.180)	0.216 (0.181-0.261)	0.308 (0.257-0.373)	0.387 (0.320-0.472)	0.498 (0.398-0.630)	0.588 (0.459-0.761)	0.683 (0.520-0.907)	0.786 (0.580-1.07)	0.931 (0.658-1.33)	1.05 (0.716-1.55)
30-min	0.245 (0.205-0.295)	0.355 (0.297-0.428)	0.506 (0.422-0.613)	0.634 (0.524-0.775)	0.817 (0.652-1.03)	0.965 (0.754-1.25)	1.12 (0.853-1.49)	1.29 (0.952-1.76)	1.53 (1.08-2.18)	1.72 (1.18-2.55)
60-min	0.361 (0.303-0.436)	0.523 (0.438-0.632)	0.746 (0.622-0.904)	0.936 (0.773-1.14)	1.21 (0.962-1.53)	1.42 (1.11-1.84)	1.65 (1.26-2.20)	1.90 (1.41-2.60)	2.25 (1.59-3.22)	2.54 (1.73-3.76)
2-hr	0.531 (0.445-0.641)	0.724 (0.605-0.874)	0.984 (0.821-1.19)	1.20 (0.993-1.47)	1.51 (1.20-1.91)	1.75 (1.37-2.26)	2.00 (1.52-2.65)	2.27 (1.67-3.10)	2.64 (1.86-3.76)	2.93 (2.00-4.34)
3-hr	0.650 (0.544-0.784)	0.867 (0.725-1.05)	1.16 (0.965-1.40)	1.40 (1.16-1.71)	1.74 (1.39-2.20)	2.00 (1.56-2.59)	2.28 (1.73-3.02)	2.56 (1.89-3.50)	2.96 (2.10-4.23)	3.28 (2.24-4.86)
6-hr	0.914 (0.765-1.10)	1.19 (0.999-1.44)	1.57 (1.31-1.90)	1.88 (1.55-2.30)	2.31 (1.84-2.92)	2.64 (2.06-3.42)	2.99 (2.27-3.97)	3.35 (2.47-4.58)	3.85 (2.72-5.49)	4.24 (2.89-6.28)
12-hr	1.20 (1.00-1.44)	1.56 (1.30-1.88)	2.05 (1.71-2.48)	2.45 (2.03-3.00)	3.02 (2.41-3.82)	3.46 (2.70-4.47)	3.92 (2.98-5.20)	4.40 (3.25-6.02)	5.07 (3.59-7.24)	5.60 (3.82-8.29)
24-hr	1.54 (1.36-1.78)	2.03 (1.79-2.35)	2.69 (2.37-3.12)	3.25 (2.84-3.80)	4.04 (3.42-4.87)	4.66 (3.87-5.74)	5.32 (4.31-6.70)	6.01 (4.74-7.78)	6.99 (5.29-9.41)	7.77 (5.69-10.8)
2-day	1.83 (1.62-2.11)	2.46 (2.17-2.84)	3.32 (2.93-3.85)	4.05 (3.54-4.73)	5.09 (4.31-6.14)	5.93 (4.92-7.29)	6.81 (5.52-8.57)	7.75 (6.11-10.0)	9.09 (6.88-12.2)	10.2 (7.45-14.2)
3-day	1.96 (1.73-2.26)	2.67 (2.36-3.08)	3.65 (3.21-4.22)	4.49 (3.92-5.24)	5.68 (4.81-6.85)	6.65 (5.52-8.18)	7.68 (6.22-9.67)	8.78 (6.93-11.4)	10.4 (7.85-13.9)	11.6 (8.53-16.2)
4-day	2.11 (1.86-2.43)	2.91 (2.57-3.36)	4.02 (3.54-4.65)	4.97 (4.34-5.80)	6.33 (5.36-7.63)	7.44 (6.17-9.15)	8.62 (6.99-10.9)	9.90 (7.81-12.8)	11.7 (8.88-15.8)	13.2 (9.69-18.4)
7-day	2.40 (2.12-2.77)	3.39 (2.99-3.91)	4.77 (4.20-5.53)	5.97 (5.22-6.97)	7.70 (6.52-9.29)	9.13 (7.57-11.2)	10.7 (8.63-13.4)	12.3 (9.71-15.9)	14.7 (11.2-19.8)	16.7 (12.2-23.3)
10-day	2.53 (2.24-2.92)	3.62 (3.20-4.19)	5.16 (4.55-5.98)	6.51 (5.69-7.60)	8.46 (7.16-10.2)	10.1 (8.36-12.4)	11.8 (9.57-14.9)	13.7 (10.8-17.8)	16.5 (12.5-22.2)	18.8 (13.8-26.2)
20-day	2.96 (2.62-3.42)	4.33 (3.82-5.00)	6.27 (5.53-7.27)	7.99 (6.98-9.33)	10.5 (8.91-12.7)	12.6 (10.5-15.6)	15.0 (12.1-18.8)	17.5 (13.8-22.7)	21.3 (16.1-28.7)	24.5 (17.9-34.1)
30-day	3.59 (3.17-4.14)	5.24 (4.63-6.05)	7.62 (6.71-8.82)	9.73 (8.50-11.4)	12.9 (10.9-15.5)	15.5 (12.9-19.1)	18.4 (14.9-23.2)	21.7 (17.1-28.1)	26.5 (20.1-35.7)	30.7 (22.5-42.7)
45-day	4.20 (3.72-4.85)	6.06 (5.36-7.01)	8.77 (7.73-10.2)	11.2 (9.78-13.1)	14.8 (12.6-17.9)	17.9 (14.9-22.1)	21.4 (17.3-26.9)	25.2 (19.9-32.7)	31.0 (23.5-41.8)	36.0 (26.4-50.1)
60-day	4.93 (4.36-5.69)	7.00 (6.18-8.09)	10.0 (8.83-11.6)	12.7 (11.1-14.9)	16.9 (14.3-20.3)	20.4 (16.9-25.1)	24.3 (19.7-30.6)	28.8 (22.7-37.2)	35.5 (26.9-47.8)	41.3 (30.3-57.5)

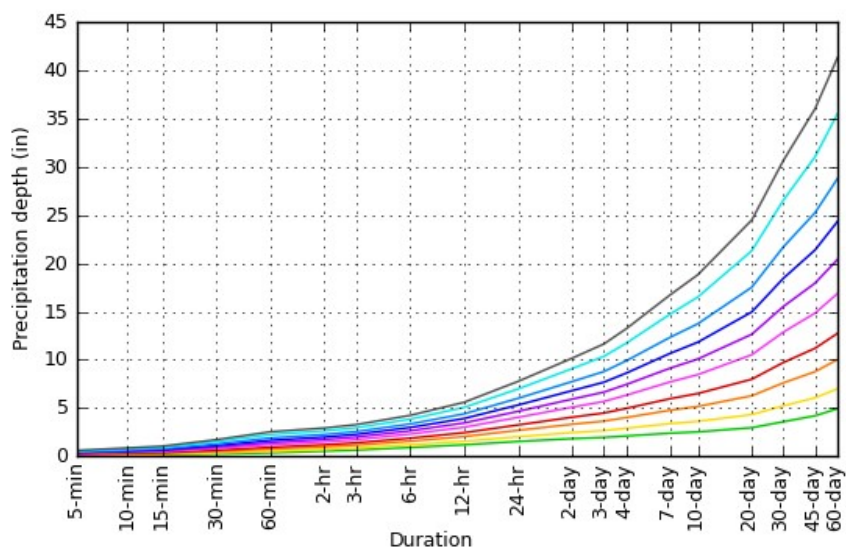
¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average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

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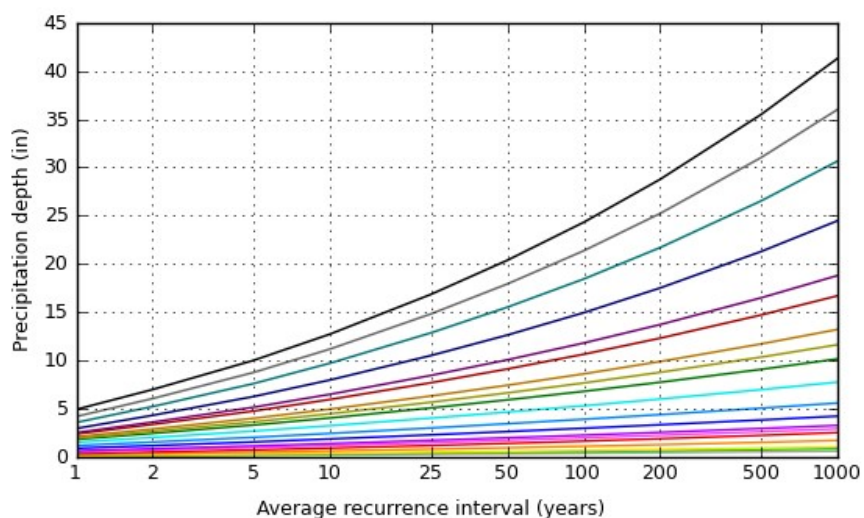
PF graphical

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

Latitude: 33.7153°, Longitude: -117.1903°



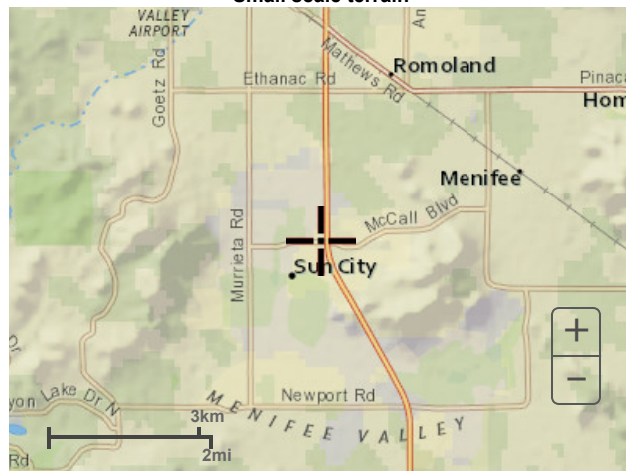
Average recurrence interval (years)
1
2
5
10
25
50
100
200
500
1000



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

Maps & aerals

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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[National Weather Service](#)
[National Water Center](#)
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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WQMP Project Report

County of Riverside Stormwater Program

Santa Ana River Watershed Geodatabase

Friday, January 31, 2020

Note: The information provided in this report and on the Stormwater Geodatabase for the County of Riverside Stormwater Program is intended to provide basic guidance in the preparation of the applicant's Water Quality Management Plan (WQMP) and should not be relied upon without independent verification.

Project Site Parcel Number(s):	RW, 339200080, 358090049, RW, RW, 339200013, RW, 339190005, 339304011, 339293010, RW, 358090050
Latitude/Longitude:	33.6859, -117.2136
Thomas Brothers Page:	
Project Site Acreage:	10.78
Watershed(s):	SANTA ANA
This Project Site Resides in the following Hydrologic Unit(s) (HUC):	HUC Name - HUC Number Meniffee Valley - 180702020303
The HUCs Contribute stormwater to the following 303d listed water bodies and TMDLs which may include drainage from your proposed Project Site:	WBID Name - WBID Number Canyon Lake (Railroad Canyon Reservoir) - CAL8021100019990208151525 Elsinore, Lake - CAL8023100019990208151100
These 303d listed Water bodies and TMDLs have the following Pollutants of Concern (POC):	Bacterial Indicators - Pathogens Nutrients - Nutrients, Organic Enrichment/Low Dissolved Oxygen Other Organics - PCBs (Polychlorinated biphenyls) Toxicity - Sediment Toxicity, Unknown Toxicity
Is the Site subject to Hydromodification:	Yes
Limitations on Infiltration:	Project Site Onsite Soils Group(s) - A, B, C, D Known Groundwater Contamination Plumes within 1000' - No Adjacent Water Supply Wells(s) - No information available please contact your local water agency for more information. Your local contact agency is EASTERN MUNICIPAL W.D.. Your local wholesaler contact agency is METROPOLITAN WATER DISTRICT.
Environmentally Sensitive Areas within 200'(Fish and Wildlife Habitat/Species):	None

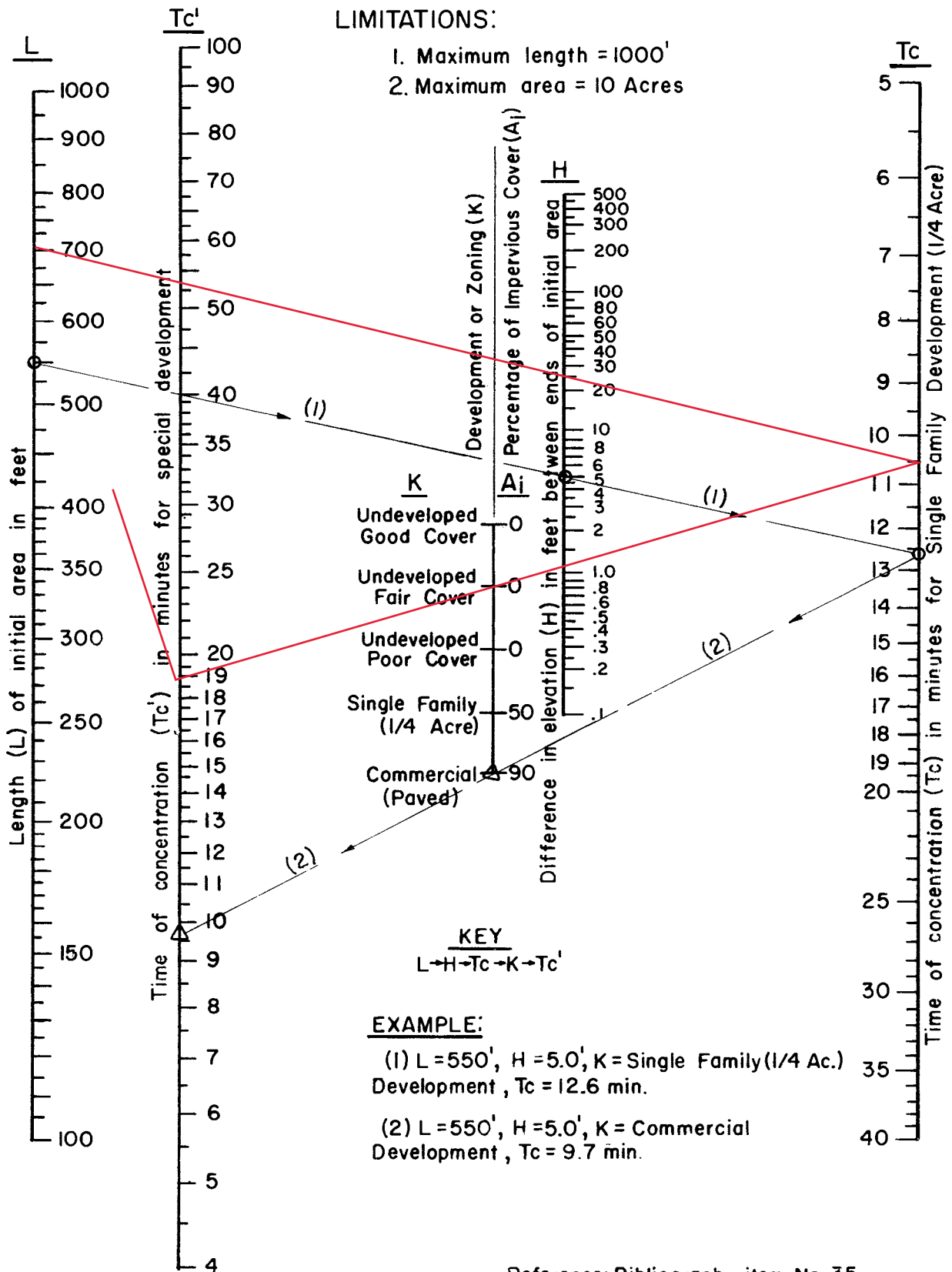
Environmentally Sensitive Areas within 200'(CVMSHCP):	None
Environmentally Sensitive Areas within 200'(WRMSHCP):	Burrowing Owl Survey Required Area,Narrow Endemic Plants Survey Req. - Area 3
Groundwater elevation from Mean Sea Level:	No Data
85th Percentile Design Storm Depth (in):	0.602
Groundwater Basin:	Perris-South
MSHCP/CVMSHCP Criteria Cell (s):	No Data
Retention Ordinance Information:	No Data
Studies and Reports Related to Project Site:	Comprehensive Nutrient Reduction Plan IBI Scores - Southern Cal bulletin118 4-sc water fact 3 7.11 8039-SAR-Hydromodification West San Jacinto GW Basin Management Plan

RAINFALL INTENSITY—INCHES PER HOUR

RIVERSIDE			RIVERSIDE (FOOTHILL AREAS)			RUBIDOUX			SAN JACINTO			SUN CITY		
DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR	DURATION MINUTES	FREQUENCY 10 YEAR	FREQUENCY 100 YEAR
5	2.75	3.92	5	3.14	4.71	5	3.18	4.71	5	2.81	4.16	5	3.25	4.85
6	2.48	3.55	6	2.84	4.26	6	2.87	4.26	6	2.56	3.79	6	2.95	4.40
7	2.28	3.26	7	2.61	3.91	7	2.64	3.91	7	2.37	3.51	7	2.72	4.06
8	2.12	3.03	8	2.42	3.63	8	2.45	3.63	8	2.22	3.29	8	2.53	3.78
9	1.99	2.84	9	2.27	3.41	9	2.30	3.41	9	2.09	3.10	9	2.38	3.55
10	1.88	2.68	10	2.14	3.21	10	2.17	3.21	10	1.98	2.94	10	2.25	3.36
11	1.78	2.54	11	2.03	3.05	11	2.06	3.05	11	1.89	2.80	11	2.14	3.19
12	1.70	2.42	12	1.94	2.91	12	1.96	2.91	12	1.81	2.68	12	2.04	3.05
13	1.62	2.32	13	1.86	2.78	13	1.88	2.78	13	1.74	2.58	13	1.96	2.92
14	1.56	2.23	14	1.78	2.67	14	1.80	2.67	14	1.68	2.48	14	1.88	2.81
15	1.50	2.14	15	1.71	2.57	15	1.74	2.57	15	1.62	2.40	15	1.81	2.71
16	1.45	2.07	16	1.66	2.48	16	1.68	2.48	16	1.57	2.32	16	1.75	2.62
17	1.40	2.00	17	1.60	2.40	17	1.62	2.40	17	1.52	2.25	17	1.70	2.54
18	1.36	1.94	18	1.55	2.33	18	1.57	2.33	18	1.48	2.19	18	1.65	2.46
19	1.32	1.88	19	1.51	2.26	19	1.52	2.26	19	1.44	2.13	19	1.60	2.39
20	1.28	1.83	20	1.46	2.20	20	1.48	2.20	20	1.40	2.08	20	1.56	2.33
22	1.22	1.74	22	1.39	2.08	22	1.41	2.08	22	1.34	1.98	22	1.48	2.21
24	1.16	1.66	24	1.32	1.99	24	1.34	1.99	24	1.28	1.90	24	1.41	2.11
26	1.11	1.58	26	1.27	1.90	26	1.28	1.90	26	1.23	1.82	26	1.36	2.03
28	1.06	1.52	28	1.22	1.82	28	1.23	1.82	28	1.19	1.76	28	1.30	1.95
30	1.02	1.46	30	1.17	1.76	30	1.19	1.76	30	1.15	1.70	30	1.26	1.88
32	.99	1.41	32	1.13	1.70	32	1.14	1.70	32	1.11	1.64	32	1.21	1.81
34	.96	1.37	34	1.09	1.64	34	1.11	1.64	34	1.08	1.59	34	1.18	1.76
36	.93	1.32	36	1.06	1.59	36	1.07	1.59	36	1.05	1.55	36	1.14	1.70
38	.90	1.29	38	1.03	1.54	38	1.04	1.54	38	1.02	1.51	38	1.11	1.66
40	.87	1.25	40	1.00	1.50	40	1.01	1.50	40	.99	1.47	40	1.08	1.61
45	.82	1.17	45	.94	1.41	45	.95	1.41	45	.94	1.39	45	1.01	1.51
50	.77	1.11	50	.88	1.33	50	.90	1.33	50	.89	1.31	50	.96	1.43
55	.73	1.05	55	.84	1.26	55	.85	1.26	55	.85	1.25	55	.91	1.36
60	.70	1.00	60	.80	1.20	60	.81	1.20	60	.81	1.20	60	.87	1.30
65	.67	.96	65	.77	1.15	65	.78	1.15	65	.78	1.15	65	.83	1.25
70	.64	.92	70	.73	1.10	70	.74	1.10	70	.75	1.11	70	.80	1.20
75	.62	.88	75	.71	1.06	75	.72	1.06	75	.72	1.07	75	.77	1.15
80	.60	.85	80	.68	1.02	80	.69	1.02	80	.70	1.04	80	.75	1.12
85	.58	.83	85	.66	.99	85	.67	.99	85	.68	1.01	85	.72	1.08
SLOPE = .550			SLOPE = .550			SLOPE = .550			SLOPE = .500			SLOPE = .530		

RCFC & WCD
HYDROLOGY MANUAL

STANDARD
INTENSITY—DURATION
CURVES DATA



Reference: Bibliography item No. 35.

RCFC & WCD
 HYDROLOGY MANUAL

**TIME OF CONCENTRATION
 FOR INITIAL SUBAREA**

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	.73	.74	.75	.76	.77
80.	.72	.73	.74	.74	.75	.76	.76	.77	.77	.78	.79
85.	.76	.77	.78	.78	.79	.79	.80	.80	.81	.82	.82
90.	.81	.81	.82	.82	.83	.83	.83	.83	.84	.84	.84
95.	.86	.86	.86	.86	.86	.87	.87	.87	.87	.87	.87
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	.84	.84	.84	.85
95.	.86	.86	.86	.86	.86	.87	.87	.87	.87	.87	.87
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	.74	.75	.76	.77	.77	.78	.79	.80
85.	.76	.77	.78	.79	.79	.80	.81	.81	.81	.82	.83
90.	.81	.82	.82	.83	.83	.83	.84	.84	.84	.85	.85
95.	.86	.86	.86	.86	.87	.87	.87	.87	.87	.87	.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	.75	.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	.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 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	.48	.52
10.	.09	.17	.23	.29	.33	.37	.40	.43	.46	.51	.54
15.	.13	.21	.27	.32	.36	.40	.43	.46	.49	.53	.56
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	.71	.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	.88	.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	.66	.69
40.	.36	.42	.47	.51	.55	.58	.60	.62	.64	.67	.69
45.	.40	.46	.51	.55	.58	.61	.63	.65	.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	.88	.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	.81	.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	.75
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	.79	.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	.88	.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	.74	.76	.77	.79	.80	.81	.82	.83
75.	.67	.71	.74	.76	.77	.79	.80	.80	.81	.82	.83
80.	.72	.75	.77	.79	.80	.81	.82	.83	.84	.85	.85
85.	.76	.79	.80	.81	.82	.83	.84	.84	.85	.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 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	.77	.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	.79	.81	.82
70.	.63	.68	.72	.75	.76	.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	.83	.84	.85	.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	.77	.79
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	.78	.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	.87	.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	.79	.80	.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	.89	.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	.84	.85	.86	.86
80.	.72	.77	.79	.81	.82	.83	.84	.85	.86	.87	.87
85.	.76	.80	.82	.83	.84	.85	.86	.86	.86	.87	.87
90.	.81	.83	.84	.85	.86	.86	.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	.77	.79	.80	.81	.82
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	.84	.85	.85
75.	.67	.74	.77	.80	.82	.83	.84	.85	.86	.86	.87
80.	.72	.77	.80	.82	.84	.85	.85	.86	.86	.87	.87
85.	.76	.80	.82	.84	.85	.85	.86	.86	.87	.87	.88
90.	.81	.83	.85	.86	.86	.87	.87	.88	.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	.86
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	.72	.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	.78	.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	.82	.83	.84	.85	.86
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	.79	.80	.81	.82	.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	.82
40.	.36	.54	.63	.69	.72	.75	.77	.78	.79	.81	.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	.78	.79	.81	.82
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	.79	.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	.87	.88	.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	.78	.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	.87
70.	.63	.73	.78	.80	.82	.83	.84	.85	.85	.86	.87
75.	.67	.76	.80	.82	.83	.84	.85	.86	.86	.87	.88
80.	.72	.79	.82	.84	.85	.86	.86	.87	.87	.88	.88
85.	.76	.82	.84	.85	.86	.87	.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. = 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	.87	.88
75.	.67	.76	.80	.82	.84	.85	.86	.86	.86	.87	.88
80.	.72	.79	.82	.84	.85	.86	.86	.87	.87	.88	.89
85.	.76	.82	.84	.86	.86	.87	.87	.88	.88	.88	.89
90.	.81	.85	.86	.87	.88	.88	.88	.88	.89	.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	.82	.83	.84	.85
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	.87
65.	.58	.72	.77	.80	.82	.83	.84	.85	.85	.86	.87
70.	.63	.74	.79	.82	.83	.84	.85	.86	.86	.87	.88
75.	.67	.77	.81	.83	.84	.85	.86	.86	.87	.87	.88
80.	.72	.80	.83	.84	.85	.86	.86	.87	.87	.88	.89
85.	.76	.82	.85	.86	.87	.87	.87	.88	.88	.88	.89
90.	.81	.85	.86	.87	.88	.88	.88	.88	.89	.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

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	.86	.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	.89	.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	.85	.86	.86
60.	.54	.71	.77	.80	.82	.83	.84	.85	.86	.86	.87
65.	.58	.73	.79	.81	.83	.84	.85	.86	.86	.87	.87
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	.80	.83	.85	.86	.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	.83	.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	.86	.87	.87	.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	.82	.83	.84	.85	.86
45.	.40	.66	.74	.78	.81	.83	.83	.84	.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	.84	.85	.85	.86	.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	.85	.86	.87
40.	.36	.65	.74	.78	.81	.83	.84	.85	.86	.87	.88
45.	.40	.67	.75	.79	.81	.83	.84	.85	.86	.87	.88
50.	.45	.69	.77	.80	.82	.84	.85	.86	.87	.88	.89
55.	.49	.71	.78	.81	.83	.84	.85	.86	.87	.88	.89
60.	.54	.74	.79	.82	.84	.85	.86	.87	.88	.89	.90
65.	.58	.76	.81	.83	.85	.86	.87	.88	.89	.90	.91
70.	.63	.78	.82	.84	.86	.87	.88	.89	.90	.91	.92
75.	.67	.80	.83	.85	.86	.87	.88	.89	.90	.91	.92
80.	.72	.82	.85	.86	.87	.88	.89	.90	.91	.92	.93
85.	.76	.84	.86	.87	.88	.89	.90	.91	.92	.93	.94
90.	.81	.86	.88	.89	.90	.91	.92	.93	.94	.95	.96
95.	.86	.88	.89	.90	.91	.92	.93	.94	.95	.96	.97
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	.81	.82	.83	.84
10.	.09	.55	.68	.74	.77	.79	.81	.82	.83	.84	.85
15.	.13	.57	.69	.75	.78	.80	.81	.83	.84	.85	.86
20.	.18	.59	.70	.76	.79	.81	.82	.83	.84	.85	.86
25.	.22	.61	.72	.77	.79	.81	.82	.83	.84	.85	.86
30.	.27	.63	.73	.77	.80	.82	.83	.84	.85	.86	.87
35.	.31	.65	.74	.78	.81	.82	.83	.84	.85	.86	.87
40.	.36	.67	.75	.79	.81	.83	.84	.85	.86	.87	.88
45.	.40	.69	.76	.80	.82	.84	.85	.86	.87	.88	.89
50.	.45	.71	.78	.81	.83	.84	.85	.86	.87	.88	.89
55.	.49	.73	.79	.82	.84	.85	.86	.87	.88	.89	.90
60.	.54	.75	.80	.83	.85	.86	.87	.88	.89	.90	.91
65.	.58	.76	.81	.84	.85	.86	.87	.88	.89	.90	.91
70.	.63	.78	.83	.85	.86	.87	.88	.89	.90	.91	.92
75.	.67	.80	.84	.85	.86	.87	.88	.89	.90	.91	.92
80.	.72	.82	.85	.86	.87	.88	.89	.90	.91	.92	.93
85.	.76	.84	.86	.87	.88	.89	.90	.91	.92	.93	.94
90.	.81	.86	.88	.89	.90	.91	.92	.93	.94	.95	.96
95.	.86	.88	.89	.90	.91	.92	.93	.94	.95	.96	.97
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	.82	.83	.84	.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	.85	.86	.87
25.	.22	.63	.73	.78	.80	.82	.83	.84	.85	.86	.87
30.	.27	.65	.74	.79	.81	.83	.84	.85	.86	.87	.88
35.	.31	.67	.75	.79	.82	.83	.84	.85	.86	.87	.88
40.	.36	.68	.76	.80	.82	.84	.85	.86	.87	.88	.89
45.	.40	.70	.78	.81	.83	.84	.85	.86	.87	.88	.89
50.	.45	.72	.79	.82	.84	.85	.86	.87	.88	.89	.90
55.	.49	.74	.80	.83	.84	.85	.86	.87	.88	.89	.90
60.	.54	.76	.81	.83	.85	.86	.87	.88	.89	.90	.91
65.	.58	.77	.82	.84	.86	.87	.88	.89	.90	.91	.92
70.	.63	.79	.83	.85	.86	.87	.88	.89	.90	.91	.92
75.	.67	.81	.84	.86	.87	.88	.89	.90	.91	.92	.93
80.	.72	.83	.86	.87	.88	.89	.90	.91	.92	.93	.94
85.	.76	.85	.87	.88	.89	.90	.91	.92	.93	.94	.95
90.	.81	.86	.88	.89	.90	.91	.92	.93	.94	.95	.96
95.	.86	.88	.89	.90	.91	.92	.93	.94	.95	.96	.97
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	.85	.86	.87
15.	.13	.62	.73	.78	.80	.82	.83	.84	.85	.86	.87
20.	.18	.63	.74	.79	.81	.82	.83	.84	.85	.86	.87
25.	.22	.65	.75	.79	.81	.83	.84	.85	.86	.87	.88
30.	.27	.67	.76	.80	.82	.83	.84	.85	.86	.87	.88
35.	.31	.68	.77	.80	.83	.84	.85	.86	.87	.88	.89
40.	.36	.70	.78	.81	.83	.84	.85	.86	.87	.88	.89
45.	.40	.72	.79	.82	.84	.85	.86	.87	.88	.89	.90
50.	.45	.73	.80	.83	.84	.85	.86	.87	.88	.89	.90
55.	.49	.75	.81	.83	.85	.86	.87	.88	.89	.90	.91
60.	.54	.77	.82	.84	.85	.86	.87	.88	.89	.90	.91
65.	.58	.78	.83	.85	.86	.87	.88	.89	.90	.91	.92
70.	.63	.80	.84	.86	.87	.88	.89	.90	.91	.92	.93
75.	.67	.82	.85	.86	.87	.88	.89	.90	.91	.92	.93
80.	.72	.83	.86	.87	.88	.89	.90	.91	.92	.93	.94
85.	.76	.85	.87	.88	.89	.90	.91	.92	.93	.94	.95
90.	.81	.86	.88	.89	.90	.91	.92	.93	.94	.95	.96
95.	.86	.88	.89	.90	.91	.92	.93	.94	.95	.96	.97
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	.75	.80	.82	.83	.84	.85	.86	.87	.87
25.	.22	.67	.76	.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	.88
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	.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. = 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	.87	.87	.88	.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	.89
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

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	.88	.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	.89	.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	.89	.89	.89	.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. = 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	.88	.89	.89	.89	.89	.89
80.	.72	.86	.88	.88	.89	.89	.89	.89	.89	.89	.89
85.	.76	.87	.88	.89	.89	.89	.89	.89	.89	.90	.90
90.	.81	.88	.89	.89	.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

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	.87	.88	.88	.88
20.	.18	.76	.83	.85	.86	.87	.87	.87	.88	.88	.89
25.	.22	.77	.83	.85	.86	.87	.87	.87	.88	.88	.89
30.	.27	.78	.83	.85	.87	.87	.87	.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	.89	.89	.89	.89	.89	.89	.89
75.	.67	.86	.88	.89	.89	.89	.89	.89	.89	.90	.90
80.	.72	.87	.88	.89	.89	.89	.89	.89	.89	.90	.90
85.	.76	.87	.89	.89	.89	.89	.89	.90	.90	.90	.90
90.	.81	.88	.89	.89	.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. = 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	.87	.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	.90
75.	.67	.87	.88	.89	.89	.89	.89	.89	.89	.90	.90
80.	.72	.87	.89	.89	.89	.89	.89	.90	.90	.90	.90
85.	.76	.88	.89	.89	.89	.89	.90	.90	.90	.90	.90
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 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	.88	.88	.88	.89	.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	.89	.89	.89	.89	.89	.89	.89
45.	.40	.85	.87	.88	.89	.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	.89	.89	.89	.89	.89	.89	.89	.89	.89
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 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	.89	.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	.89	.89	.89	.89	.89	.89	.89	.89	.90
95.	.86	.90	.89	.89	.89	.89	.89	.89	.89	.89	.90
100.	.90	.90	.89	.89	.89	.89	.89	.89	.89	.89	.90

RUNOFF COEFFICIENT

CURVE DATA

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

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

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**RUNOFF INDEX NUMBERS
FOR
PERVIOUS AREA**

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.

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**RUNOFF INDEX NUMBERS
FOR
PERVIOUS AREA**

Appendix E



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



October 18, 2020

Preface

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

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

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

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

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

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

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Western Riverside Area, California.....	10
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Dv—Domino silt loam, saline-alkali.....	11
GyD2—Greenfield sandy loam, 8 to 15 percent slopes, eroded.....	12
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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: May 25, 2019—Jun 25, 2019

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
CkF2	Cieneba rocky sandy loam, 15 to 50 percent slopes, eroded	2.2	21.7%
Dv	Domino silt loam, saline-alkali	4.4	43.8%
GyD2	Greenfield sandy loam, 8 to 15 percent slopes, eroded	0.0	0.1%
MmB	Monserate sandy loam, 0 to 5 percent slopes	2.4	23.6%
VsC	Vista coarse sandy loam, 2 to 8 percent slopes	1.1	10.8%
Totals for Area of Interest		10.0	100.0%

Map Unit Descriptions

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

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

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

Custom Soil Resource Report

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

CkF2—Cieneba rocky sandy loam, 15 to 50 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcsf
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: 75 percent
Minor components: 25 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: 14 to 22 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

Rock outcrop

Percent of map unit: 10 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 3 percent
Hydric soil rating: No

Friant

Percent of map unit: 3 percent
Hydric soil rating: No

Escondido

Percent of map unit: 3 percent
Hydric soil rating: No

Vista

Percent of map unit: 3 percent
Hydric soil rating: No

Fallbrook

Percent of map unit: 3 percent
Hydric soil rating: No

Dv—Domino silt loam, saline-alkali

Map Unit Setting

National map unit symbol: hct8
Elevation: 1,000 to 1,800 feet
Mean annual precipitation: 12 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Domino

Setting

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

Typical profile

H1 - 0 to 14 inches: silt loam
H2 - 14 to 27 inches: silt loam
H3 - 27 to 36 inches: cemented
H4 - 36 to 63 inches: loam, sandy loam
H4 - 36 to 63 inches:

Custom Soil Resource Report

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Available water capacity: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: R019XD068CA - SILTY BASIN
Hydric soil rating: No

Minor Components

Chino

Percent of map unit: 10 percent
Hydric soil rating: No

Willows

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

GyD2—Greenfield sandy loam, 8 to 15 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcvx
Elevation: 100 to 3,500 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Greenfield

Setting

Landform: Alluvial fans, terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 26 inches: sandy loam
H2 - 26 to 43 inches: fine sandy loam
H3 - 43 to 60 inches: loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high
(0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.3 inches)

Interpretive groups

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

Minor Components

Hanford

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

Arlington

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

Pachappa

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

MmB—Monserate sandy loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hcx4

Custom Soil Resource Report

Elevation: 700 to 2,500 feet

Mean annual precipitation: 10 to 18 inches

Mean annual air temperature: 63 to 64 degrees F

Frost-free period: 220 to 280 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Monserate and similar soils: 85 percent

Minor components: 15 percent

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

Description of Monserate

Setting

Landform: Alluvial fans

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 10 inches: sandy loam

H2 - 10 to 28 inches: sandy clay loam

H3 - 28 to 45 inches: indurated

H4 - 45 to 57 inches: cemented

H5 - 57 to 70 inches: loamy coarse sand, coarse sandy loam

H5 - 57 to 70 inches:

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: 20 to 39 inches to duripan

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water capacity: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: C

Ecological site: R019XD029CA

Hydric soil rating: No

Minor Components

Greenfield

Percent of map unit: 5 percent

Hydric soil rating: No

Hanford

Percent of map unit: 5 percent

Hydric soil rating: No

Tujunga

Percent of map unit: 5 percent

Hydric soil rating: No

VsC—Vista coarse sandy loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hczx

Elevation: 400 to 3,900 feet

Mean annual precipitation: 10 to 18 inches

Mean annual air temperature: 59 to 64 degrees F

Frost-free period: 210 to 300 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Vista and similar soils: 85 percent

Minor components: 15 percent

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

Description of Vista

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 granite and/or residuum weathered from granodiorite

Typical profile

H1 - 0 to 15 inches: coarse sandy loam

H2 - 15 to 24 inches: coarse sandy loam

H3 - 24 to 30 inches: weathered bedrock

Properties and qualities

Slope: 2 to 8 percent

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

Drainage class: Well drained

Runoff class: Low

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 2.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e

Land capability classification (nonirrigated): 4e

Custom Soil Resource Report

Hydrologic Soil Group: B
Ecological site: R019XD029CA
Hydric soil rating: No

Minor Components

Bonsall

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

Fallbrook

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

Cieneba

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

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Custom Soil Resource Report

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South Shore Testing & Environmental

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E-mail: ss.testing@aol.com

February 24, 2020

Mr. Rich Wilson
Trademark Construction Co., Inc.
15916 Bernardo Center Drive
San Diego, CA 92127

SUBJECT: ONSITE STORMWATER INFILTRATION SYSTEM INVESTIGATION

Proposed Multi-Family Residential Development
APN: 339-200-080, 9.92-Acres
NE Corner of Brea and Normandy Roads
City of Menifee, Riverside County, California
Work Order No. 4722002.01

Dear Mr. Wilson:

In accordance with your authorization, we have conducted percolation testing for the infiltration system for the proposed multi-family residential development. The purpose of our investigation was to provide infiltration rates for proposed infiltration systems. The proposed infiltration test areas were designated on a 40-scale Conceptual Site Plan (Summa Architecture, 2019) by the project civil engineer, Kolibrien Civil, Structural, and Surveying of Temecula, California.

Site Description

The subject site is a nearly square-shaped, 9.92-acre parcel of land located the northeast corner of Brea and Normandy Roads in the city of Menifee, Riverside County, California. The site is bordered on the north by a flood control channel and an existing single-family residential tract, on the west by Brea Road and a mini-storage facility, on the south by Normandy Road and a park, and on the east by vacant undeveloped land.

Topographically on the subject site, for the most part, consists of low rolling gently sloping terrain with natural gradients of less than 5 percent. The southeast corner of the site consists of a small hill with numerous large unweathered granitic boulders up to 20-ft in diameter. Natural gradients on the hill are approximately 15 percent. Drainage is accomplished by sheetflow to the northwest toward Brea Road and the flood control channel. Vegetation onsite generally consists of a sparse to moderate low dried growth of annual weeds and grasses.

Proposed Development

The proposed development consists of the construction of a multi-family residential development with interior parking and driveways, a 3-story commercial building, a fitness building, a clubhouse, a recreation area, and landscape area. The Conceptual Site Plan (Summa, 2019) depicts the extreme southeast corner of the site, which is underlain by numerous granitic boulders, is to remain vacant and in a relatively natural condition.

Percolation Investigation

Percolation testing was conducted on January 31, 2020 at locations designated by the project civil engineer. Six (6) tests were performed within the onsite late to middle Pleistocene-age Old alluvial fan deposits (Morton, 2003) on the northerly portion of the subject site. Six (6) exploratory trenches were advanced to a depth of 3-ft below the ground surface (bgs) with an infiltration test performed at the bottom of each trench. The Old alluvial fan deposits, for the most part, consisted of silty Sand (Unified Soil Classification – SM) that can generally be described as red to orange brown, fine to coarse grained, minor gravel size, abundant fines, dry (top 1-ft) to slightly moist, loose (top 2-ft) to medium dense to very dense and excavated with slight difficulty. Approximately 0.5 to 1-ft of undocumented fills were observed overlying the Old alluvial fan deposits in most areas. Infiltration test pits were advanced to a depth of 36-ft bgs utilizing a Case No. 590 extend-a-backhoe equipped with a 18-inch bucket. Our field personnel logged the exploratory trenches and a copies of our Exploratory Trench Logs are presented in **Appendix B**.

GROUNDWATER

Groundwater was not encountered to the maximum depth explored of 16.2-ft below the ground surface (bgs) previously excavated on the northerly portion of the subject site (T.H.E., 2003). Based on historic regional groundwater information (DWR, 1978), regional high groundwater is at least 100-ft bgs on the lower elevations of the subject site. Minor fluctuations can and will likely occur in moisture or free water content of the soil owing to rainfall and irrigation over time.

SUMMARY OF TEST PROCEDURES

The testing procedure was performed in accordance with Riverside County Department of Environmental Health's "Local Management Program for Onsite Wastewater Treatment Systems", which became effective October 5, 2016 and the resulting perc rates were converted to infiltration rates utilizing the Porchet Method as outlined in the Riverside County Flood Control and Water Conservation District, "Design Handbook for Low Impact Development Best Management Practices" dated September 2011. The percolation tests were performed at a depth of 3-ft bgs (per

the project civil engineer). Owing to the mostly moderately fast rates the procedures for **Normal** soils were followed (see percolation test sheets).

Conclusion

Testing indicated infiltration rates at 3-ft below existing grade within the native soils obtained fast to moderately fast rates of 6.0 to 13.3-min/inch percolation rate. The percolation rates were converted to infiltration rate utilizing the Porchet Method. The converted infiltration rates varied from 1.1 to 3.5-inches/hr. The rate provided does not include a safety factor. The test locations are presented on our Infiltration Test Location Map, **Plate 1**.

PERCOLATION TEST NO.	DEPTH OF TEST BELOW GRADE (In Feet)	PERCOLATION RATE (Min/Inch)	INFILTRATION RATE (In/Hr)
1	3	7.1	4.3
2	3	13.3	2.2
3	3	12.0	3.1
4	3	15.0	2.7
5	3	6.0	7.0
6	3	7.5	5.3

CLOSURE

It should be noted that infiltration rates determined by testing are ultimate rates based on short-duration field test results utilizing clear water. Infiltration rates can be affected by silt build-up, debris, degree of soil saturation, and other factors. An appropriate safety factor should be applied prior to use in design to account for subsoil inconsistencies, possible compaction related to site grading, and potential silting of the percolating soils. The safety factor should also be determined with consideration to other factors in the system design, particularly storm water volume estimates and the safety factors associated with those design components.

LIMITATIONS

The tested rates are representative for the areas and soil types tested. Should the systems be moved, or the exposed soil types are found to different within the proposed systems, the approved infiltration rates may not apply. Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable Geotechnical Engineers and Geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The report is issued with the understanding that it is used only by the owner and it is the sole responsibility of the owner or their representative to ensure that the information and

SOUTH SHORE TESTING & ENVIRONMENTAL

INFILTRATION TEST LOCATION MAP
 PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT
 APN: 329-200-080, 9.92-ACRES
 NE CORNER OF BEREA & NORMANDY ROADS
 CITY OF MENIFEE, RIVERSIDE COUNTY, CALIFORNIA

WORK ORDER: 4722002.011 DATE: FEB. 2020 PLATE: 1 OF 1

APPROXIMATE LOCATION OF INFILTRATION TESTS

1-6

265 OPEN/CARPORT STALLS
 490 TOTAL STALLS PROVIDED

96 STALLS
 174 STALLS
 65 STALLS
 24 STALLS
 359 STALLS
 90 STALLS

TOTAL STALLS REQUIRED

DWELLING UNIT SUMMARY

PLAN 1 1BD/1BA 700 SF 96 UNITS 12.5%
 PLAN 2 2BD/2BA 980 SF 116 UNITS 20.1%
 PLAN 3 3BD/2BA 1,200 SF 26 UNITS 9.8%

SITE AREA 432,115 SF

RESIDENTIAL AREA 260,000 SF (0.59 FAR)

RESIDENTIAL GARAGES 52,800 SF (0.11 FAR)

COMMERCIAL AREA 30,000 SF (0.07 FAR)

TOTAL BUILDING AREA 342,800 SF

F.A.R. 0.8 (1.0 ALLOWED)

STATEMENT OF OPERATIONS

HORIZONTAL MIXED USE WITH WALK-UP TYPE
 APARTMENTS, COMMERCIAL SPACE TO CONSIST OF
 OFFICE SPACE AND CHILD CARE FACILITIES, EMPLOYEES
 AND USERS TO BE DETERMINED PER SCHEMATIC DESIGN.

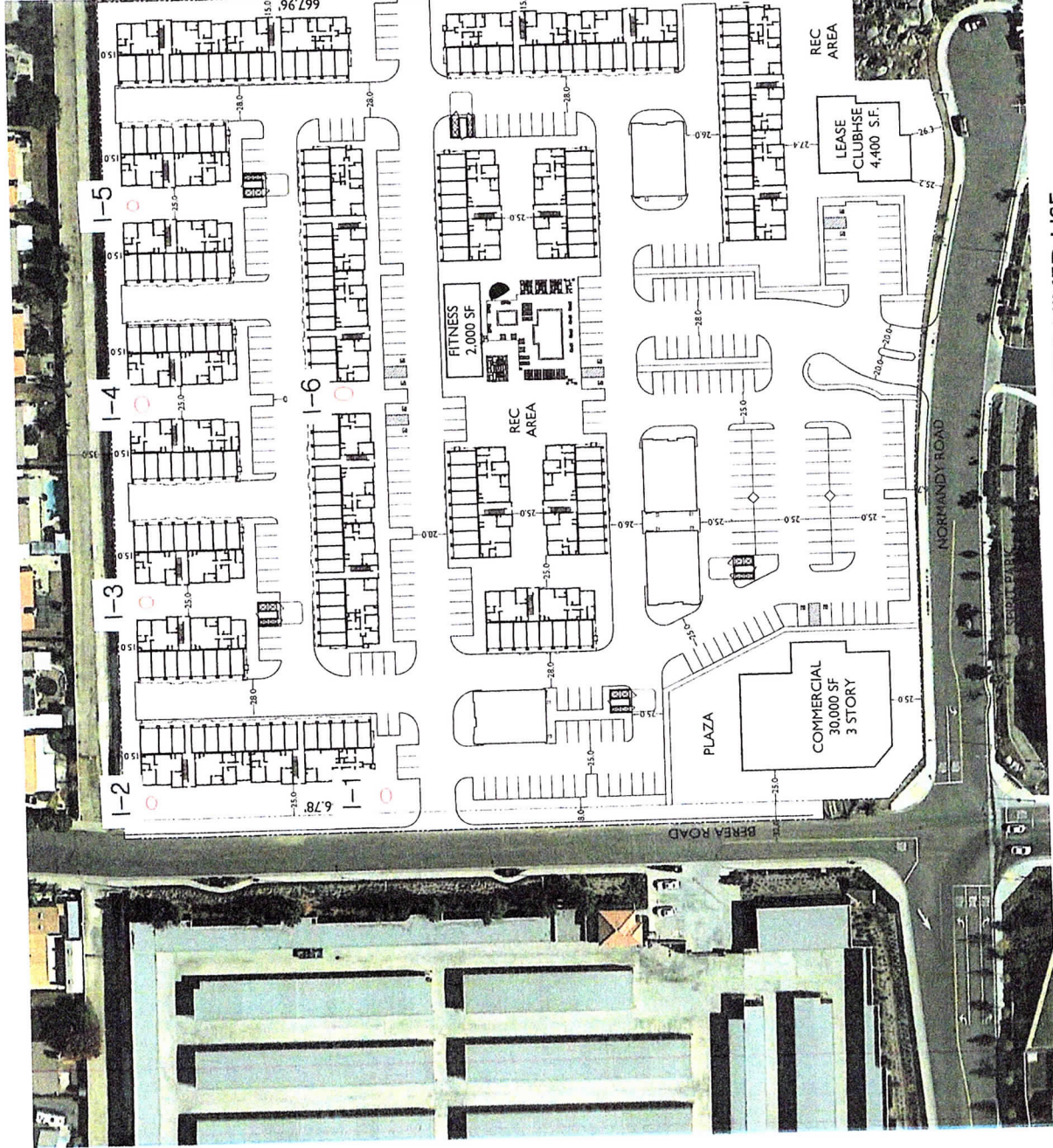


CONCEPTUAL SITE PLAN

SP

5256 S. MISSION ROAD STE. 404
 BONSALL, CA. 92003
 760.724.1198

SUMMA
 ARCHITECTURE



BOULDERS MIXED USE

Scale 0 40 80 120
 JAN 13, 2019

MENIFEE, CA

TRADERMARK CONSTRUCTION
 1337 E BERNARDINO CENTER DRIVE
 SAN DIEGO, CA 92127
 (760) 489-9563

Mr. Rich Wilson
Trademark Construction Co., Inc.
February 24, 2020
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recommendations contained herein are brought to the attention of the architect, engineer, and appropriate jurisdictional agency for the project and incorporated into the plans; and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations contained herein during construction and in the field.

The samples taken and used for testing and the observations made are believed representative; however, soil and geologic conditions can vary significantly between test locations. The evaluation or identification of the potential presence of hazardous or corrosive materials was not part of the scope of services provided by **South Shore Testing & Environmental**, or its assigns.

The findings of this report are valid as of the present date. However, changes in the condition of a property can occur with the passage of time, whether due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified. The firm that performed the geotechnical investigation for this project should be retained to provide testing observation services during construction to maintain continuity of geotechnical interpretation and to check that the recommendations presented herein are implemented during construction of improvements.

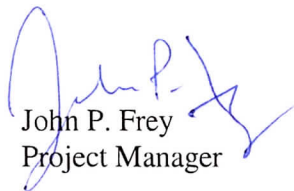
If another geotechnical firm is selected to perform the testing and observation services during construction operations, that firm should prepare a letter indicating their intent to assume the responsibilities of project geotechnical engineer of record. Selection of another firm to perform any of the recommended activities or failure to retain the undersigned to perform the recommended activities wholly absolves **South Shore Testing & Environmental**, the undersigned, and its assigns from any and all liability arising directly or indirectly from any aspects of this project.

Mr. Rich Wilson
Trademark Construction Co., Inc.
February 24, 2020
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We appreciate the opportunity to be of service. Limitations and conditions contained in reference documents are considered in full force and applicable. If you have any questions, please do not hesitate to call our office.

Respectfully Submitted,

South Shore Testing & Environmental



John P. Frey
Project Manager



William C. Hobbs, RCE 42265
Civil Engineer

ATTACHMENTS

Plate 1 – Infiltration Test Location Map
Appendix A –References
Appendix B – Exploratory Trench Logs
Appendix C - Percolation Test Data

APPENDIX A

References

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APPENDIX B

Exploratory Trench Logs

LOGGED BY: JPF							METHOD OF EXCAVATION: CASE #580 N BACKHOE EQUIPPED W/ 18" BUCKET ELEVATION: ±			DATE OBSERVED: 1/30/2020 LOCATION: SEE PLATE 1		
DEPTH (FEET) CLASSIFICATION BLOWS/FOOT UNDISTURBED SAMPLE BULK SAMPLE MOISTURE CONTENT(%) INPLACE DRY DENSITY (PCF)							TEST PIT NO. <u>1</u> DESCRIPTION			SOIL TEST		
							<u>UNDOCUMENTED FILL</u> SILTY SAND (SM): DARK BROWN, FINE TO COARSE GRAINED, MINOR GRAVEL, LOOSE POROUS			INFILTRATION TEST		
							<u>OLD ALLUVIAL DEPOSITS</u> SILTY SAND (SM): RED BROWN, FINE TO COARSE GRAINED, ABUNDANT FINES, MINOR PINPOINT PORES IN UPPER 1 -FT, MINOR GRAVEL SIZE, DENSITY INCREASES W/ DEPTH SLIGHTLY MOIST					
							TOTAL DEPTH=10.2FT NO GROUNDWATER NO CAVING					
JOB NO: 4722002.00							LOG OF TEST PIT			FIGURE: T-1		

LOGGED BY: JPF							METHOD OF EXCAVATION: CASE #580 N BACKHOE EQUIPPED W/ 18" BUCKET ELEVATION: +			DATE OBSERVED: 1/30/2020 LOCATION: SEE PLATE 1			
CLASSIFICATION BLOWS/FOOT UNDISTURBED SAMPLE BULK SAMPLE MOISTURE CONTENT(%) IN PLACE DRY DENSITY (PCF)							TEST PIT NO. <u>2</u> DESCRIPTION				SOIL TEST		
							UNDOCUMENTED FILL SANDY SILT (ML): DARK BROWN, MINOR SAND, LOOSE, POROUS OLD ALLUVIAL DEPOSITS SILTY SAND (SM): REDDISH BROWN, FINE TO COARSE GRAINED, NUMEROUS PINPOINT PORES AND FINE ROOTS IN TOP 1 FT, MINOR GRAVEL SZ, SLIGHTLY MOIST, INCREASING IN DENSITY WITH DEPTH TOTAL DEPTH=10.2FT NO GROUNDWATER NO CAVING				INFILTRATION TEST		
5 10 15 20 25 30 35 40													
JOB NO: 4722002.00							LOG OF TEST PIT				FIGURE: T-2		

LOGGED BY: JPF							METHOD OF EXCAVATION: CASE #580 N BACKHOE EQUIPPED W/ 18" BUCKET ELEVATION: ±			DATE OBSERVED: 1/30/2020 LOCATION: SEE PLATE 1	
DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	TEST PIT NO. <u>3</u> DESCRIPTION			SOIL TEST	
							<u>UNDOCUMENTED FILL</u>			INFILTRATION TEST	
							<u>ALLUVIAL FAN DEPOSITS</u>				
							SILTY SAND (SM): DARK RED BROWN, FINE TO MEDIUM GRAINED, MINOR COARSE, MODERATELY SORTED, SLIGHTLY MOIST, NUMEROUS PINPOINT PORES IN UPPER 1-2 FT TOTAL DEPTH=3.0FT NO GROUNDWATER NO CAVING				
5											
10											
15											
20											
25											
30											
35											
40											
JOB NO: 4722002.00							LOG OF TEST PIT			FIGURE: T-3	

LOGGED BY: JPF							METHOD OF EXCAVATION: CASE #580 N BACKHOE EQUIPPED W/ 18" BUCKET ELEVATION: ±			DATE OBSERVED: 1/30/2020 LOCATION: SEE PLATE 1		
DEPTH (ft) CLASSIFICATION BLOWS/FOOT UNDISTURBED SAMPLE BULK SAMPLE MOISTURE CONTENT(%) INPLACE DRY DENSITY (PCF)							TEST PIT NO. <u>4</u> DESCRIPTION				SOIL TEST	
							<u>UNDOCUMENTED FILL</u>				INFILTRATION TEST	
							SILTY SAND (SM): DARK BROWN, FINE TO MEDIUM GRAINED, MINOR COARSE, LOOSE, POROUS					
							<u>OLD ALLUVIAL FAN DEPOSITS</u>					
5							SILTY SAND (SM): DARK RED BROWN, FINE TO COARSE GRAINED, MODERATELY SORTED, LOOSE TO MEDIUM DENSE, MINOR GRAVEL SIZE					
10							TOTAL DEPTH 3.0FT NO GROUNDWATER NO CAVING					
15												
20												
25												
30												
35												
40												
JOB NO: 4722002.00							LOG OF TEST PIT				FIGURE: T-4	

LOGGED BY: JPF								METHOD OF EXCAVATION: CASE #580 N BACKHOE EQUIPPED W/ 18" BUCKET ELEVATION: ±								DATE OBSERVED: 1/30/2020 LOCATION: SEE PLATE 1							
DEPTH (FEET)								TEST PIT NO. 5 DESCRIPTION								SOIL TEST							
								UNDOCUMENTED FILL								INFILTRATION TEST							
								SANDY SILT (ML) DARK BROWN, DRY, LOOSE, POROUS, MINOR CONSTRUCTION DEBRIS POROUS															
5								OLD ALLUVIAL FAN DEPOSITS SILTY SAND (SM): DARK RED BROWN, FINE TO COARSE GRAINED, MINOR GRAVEL SIZE, MODERATELY SORTED, SLIGHTLY MOIST, DENSITY INCREASING WITH DEPTH															
								TOTAL DEPTH 3.0FT NO GROUNDWATER NO CAVING															
10																							
15																							
20																							
25																							
30																							
35																							
40																							
JOB NO: 4722002.00								LOG OF TEST PIT								FIGURE: T-5							

LOGGED BY: JPF							METHOD OF EXCAVATION: CASE #580 N BACKHOE EQUIPPED W/ 18" BUCKET ELEVATION: ±			DATE OBSERVED: 1/30/2020 LOCATION: SEE PLATE 1	
DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	TEST PIT NO. 6 DESCRIPTION			SOIL TEST	
							<u>UNDOCUMENTED FILL</u> GRAVELLY SANDY SILT (ML): DARK BROWN, SANDY IN PART, DRY, LOOSE, MINOR CONSTRUCTION DEBRIS			INFILTRATION TEST	
5							<u>OLD ALLUVIAL FAN DEPOSITS</u> SILTY SAND (SM): DARK RED BROWN, FINE TO COARSE GRAINED, LOOSE IN UPPER 2-FT, SLIGHTLY MOIST, INCREASING IN DENSITY WITH DEPTH				
10							TOTAL DEPTH 3.0FT NO GROUNDWATER NO CAVING				
15											
20											
25											
30											
35											
40											
JOB NO: 4722002.00							LOG OF TEST PIT			FIGURE: T-6	

APPENDIX C

Percolation Test Results

Appendix 4

Leach Line Percolation Data Sheet

Project <i>Trademark</i>	Job No. <i>472 2002.01</i>
Test Hole No. <i>I-1</i>	Date Excavated: <i>1-30-2020</i>
Depth of Test Hole: <i>36"</i>	Soil Classification <i>SM-ML</i>
Check for Sandy Soil Criteria Tested by: <i>JPF</i>	Date: _____ Presoak: <i>1-30-2020</i>
Actual Percolation Tested by: <i>JPF</i>	Date: <i>1-31-2020</i>

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min)	Initial Water Level (Inches)	Final Water Level (Inches)	▲ in Water Level (Inches)
<u>1</u>	<u>8:30</u> <u>8:55</u>	<i>25</i>	<i>6"</i>	<i>0.25</i>	<i>5 3/4</i>
<u>2</u>	_____				

Use Normal Sandy (Circle One) Soil Criteria

Time	Time Interval (Min)	Total Elapsed Time (Min)	Initial Water Level (Inches)	Final Water Level (Inches)	▲ in Water Level (Inches)	Percolation Rate (Min/Inch)
<u>9:48</u> <u>10:18</u>	<i>30</i>	<i>30</i>	<i>6"</i>	<i>1.0</i>	<i>5"</i>	<i>6.0</i>
<u>10:18</u> <u>10:48</u>	<i>30</i>	<i>60</i>	<i>6"</i>	<i>1 1/2</i>	<i>4 1/2</i>	<i>6.7</i>
<u>10:48</u> <u>11:18</u>	<i>30</i>	<i>90</i>	<i>6"</i>	<i>1 3/4</i>	<i>4 1/4</i>	<i>7.1</i>
<u>11:18</u> <u>11:48</u>	<i>30</i>	<i>120</i>	<i>6"</i>	<i>1 3/4</i>	<i>4 1/4</i>	<i>7.1</i>
<u>11:48</u> <u>12:18</u>	<i>30</i>	<i>150</i>	<i>6"</i>	<i>1 3/4</i>	<i>4 1/4</i>	<i>7.1</i>
<u>12:18</u> <u>12:48</u>	<i>30</i>	<i>180</i>	<i>6"</i>	<i>1 3/4</i>	<i>4 1/4</i>	<i>7.1</i>
<u>12:48</u> <u>1:18</u>	<i>30</i>	<i>240</i>	<i>6"</i>	<i>1 3/4</i>	<i>4 1/4</i>	<i>7.1</i>

Appendix 4

Leach Line Percolation Data Sheet

Project <u>Trademark</u>	Job No. <u>472 2002.01</u>
Test Hole No. <u>I-2</u>	Date Excavated: <u>1-30-2020</u>
Depth of Test Hole: <u>36"</u>	Soil Classification <u>SM-ML</u>
Check for Sandy Soil Criteria Tested by: <u>JPF</u>	Date: _____ Presoak: <u>1-30-2020</u>
Actual Percolation Tested by: <u>JPF</u>	Date: <u>1-31-2020</u>

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min)	Initial Water Level (Inches)	Final Water Level (Inches)	▲ in Water Level (Inches)
<u>1</u>	<u>8:32</u> <u>8:57</u>	<u>25</u>	<u>6 ²/₁₆</u>	<u>2 ¹/₄</u>	<u>3 ³/₄</u>
<u>2</u>	_____				

Use: Normal Sandy (Circle One) Soil Criteria

Time	Time Interval (Min)	Total Elapsed Time (Min)	Initial Water Level (Inches)	Final Water Level (Inches)	▲ in Water Level (Inches)	Percolation Rate (Min/Inch)
<u>9:51</u> <u>10:21</u>	<u>30</u>	<u>30</u>	<u>6"</u>	<u>2.5</u>	<u>3.5</u>	<u>8.6</u>
<u>10:21</u> <u>10:51</u>	<u>30</u>	<u>60</u>	<u>6"</u>	<u>2.75</u>	<u>3 ¹/₄</u>	<u>9.2</u>
<u>10:51</u> <u>11:21</u>	<u>30</u>	<u>90</u>	<u>6"</u>	<u>3 ⁰/₁₆</u>	<u>3 ⁰/₁₆</u>	<u>10</u>
<u>11:21</u> <u>11:51</u>	<u>30</u>	<u>120</u>	<u>6"</u>	<u>3 ¹/₂</u>	<u>2 ¹/₂</u>	<u>12</u>
<u>11:51</u> <u>12:21</u>	<u>30</u>	<u>150</u>	<u>6"</u>	<u>3 ³/₄</u>	<u>2 ¹/₄</u>	<u>13.3</u>
<u>12:21</u> <u>12:51</u>	<u>30</u>	<u>180</u>	<u>6"</u>	<u>3 ³/₄</u>	<u>2 ¹/₄</u>	<u>13.3</u>
<u>12:51</u> <u>1:21</u>	<u>30</u>	<u>240</u>	<u>6"</u>	<u>3 ³/₄</u>	<u>2 ¹/₄</u>	<u>13.3</u>

Appendix 4

Leach Line Percolation Data Sheet

Project <u>Trademark</u>	Job No. <u>472 2002.01</u>
Test Hole No. <u>I-3</u>	Date Excavated: <u>1-30-2020</u>
Depth of Test Hole: <u>36"</u>	Soil Classification <u>SM-ML</u>
Check for Sandy Soil Criteria Tested by: <u>JPF</u>	Date: _____ Presoak: <u>1-30-2020</u>
Actual Percolation Tested by: <u>JPF</u>	Date: <u>1-31-2020</u>

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min)	Initial Water Level (Inches)	Final Water Level (Inches)	▲ in Water Level (Inches)
<u>1</u>	<u>8:34</u> <u>8:59</u>	<u>25</u>	<u>6 9/16</u>	<u>2.75</u>	<u>3 1/4</u>
<u>2</u>	_____				

Use Normal Sandy (Circle One) Soil Criteria

Time	Time Interval (Min)	Total Elapsed Time (Min)	Initial Water Level (Inches)	Final Water Level (Inches)	▲ in Water Level (Inches)	Percolation Rate (Min/Inch)
<u>9:52</u> <u>10:22</u>	<u>30</u>	<u>30</u>	<u>6 9/16</u>	<u>2.5</u>	<u>3 1/2</u>	<u>8.6</u>
<u>10:22</u> <u>10:52</u>	<u>30</u>	<u>60</u>	<u>6 9/16</u>	<u>3.0</u>	<u>3.0</u>	<u>10</u>
<u>10:52</u> <u>11:22</u>	<u>30</u>	<u>90</u>	<u>6 9/16</u>	<u>3.0</u>	<u>3.0</u>	<u>10</u>
<u>11:22</u> <u>11:52</u>	<u>30</u>	<u>120</u>	<u>6 9/16</u>	<u>3 1/4</u>	<u>2 3/4</u>	<u>10.9</u>
<u>11:52</u> <u>12:22</u>	<u>30</u>	<u>150</u>	<u>6 9/16</u>	<u>3 1/4</u>	<u>2 3/4</u>	<u>10.9</u>
<u>12:22</u> <u>12:52</u>	<u>30</u>	<u>180</u>	<u>6 9/16</u>	<u>3 1/4</u>	<u>2 1/2</u>	<u>12</u>
<u>12:52</u> <u>1:22</u>	<u>30</u>	<u>240</u>	<u>6 9/16</u>	<u>3 1/4</u>	<u>2 1/2</u>	<u>12</u>

Appendix 4

Leach Line Percolation Data Sheet

Project <u>Trademark</u>	Job No. <u>472 2002.01</u>
Test Hole No. <u>I-4</u>	Date Excavated: <u>1-30-2020</u>
Depth of Test Hole: <u>36"</u>	Soil Classification <u>SM-ML</u>
Check for Sandy Soil Criteria Tested by: <u>JPF</u>	Date: _____ Presoak: <u>1-30-2020</u>
Actual Percolation Tested by: <u>JPF</u>	Date: <u>1-31-2020</u>

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min)	Initial Water Level (Inches)	Final Water Level (Inches)	▲ in Water Level (Inches)
<u>1</u>	<u>8:36</u> <u>9:01</u>	<u>25</u>	<u>6³/₄</u>	<u>2³/₄</u>	<u>3¹/₄</u>
<u>2</u>	_____				

Use: Normal Sandy (Circle One) Soil Criteria

Time	Time Interval (Min)	Total Elapsed Time (Min)	Initial Water Level (Inches)	Final Water Level (Inches)	▲ in Water Level (Inches)	Percolation Rate (Min/Inch)
<u>9:55</u> <u>10:25</u>	<u>30</u>	<u>30</u>	<u>6³/₄</u>	<u>3"</u>	<u>3"</u>	<u>10</u>
<u>10:25</u> <u>10:55</u>	<u>30</u>	<u>60</u>	<u>6³/₄</u>	<u>3¹/₂</u>	<u>2¹/₂</u>	<u>12</u>
<u>10:55</u> <u>11:25</u>	<u>30</u>	<u>90</u>	<u>6³/₄</u>	<u>3³/₄</u>	<u>2¹/₄</u>	<u>13.3</u>
<u>11:25</u> <u>11:55</u>	<u>30</u>	<u>120</u>	<u>6"</u>	<u>3³/₄</u>	<u>2¹/₄</u>	<u>13.3</u>
<u>11:55</u> <u>12:25</u>	<u>30</u>	<u>150</u>	<u>6³/₄</u>	<u>4"</u>	<u>2"</u>	<u>15</u>
<u>12:25</u> <u>12:55</u>	<u>30</u>	<u>180</u>	<u>6³/₄</u>	<u>4"</u>	<u>2"</u>	<u>15</u>
<u>12:55</u> <u>1:25</u>	<u>30</u>	<u>240</u>	<u>6³/₄</u>	<u>4"</u>	<u>2"</u>	<u>15</u>

Appendix 4

Leach Line Percolation Data Sheet

Project <u>Trademark</u>	Job No. <u>472 2002.01</u>
Test Hole No. <u>I-5</u>	Date Excavated: <u>1-30-2020</u>
Depth of Test Hole: <u>36"</u>	Soil Classification <u>SM-ML</u>
Check for Sandy Soil Criteria Tested by: <u>JPF</u>	Date: _____ Presoak: <u>1-30-2020</u>
Actual Percolation Tested by: <u>JPF</u>	Date: <u>1-31-2020</u>

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min)	Initial Water Level (Inches)	Final Water Level (Inches)	▲ in Water Level (Inches)
<u>1</u>	<u>8:39</u> <u>9:04</u>	<u>25</u>	<u>6 ²/₁₆</u>	<u>1/4</u>	<u>5 ³/₄</u>
<u>2</u>	_____				

Use Normal Sandy (Circle One) Soil Criteria

Time	Time Interval (Min)	Total Elapsed Time (Min)	Initial Water Level (Inches)	Final Water Level (Inches)	▲ in Water Level (Inches)	Percolation Rate (Min/Inch)
<u>11:00</u> <u>11:30</u>	<u>30</u>	<u>30</u>	<u>6"</u>	<u>1/2</u>	<u>5 1/2</u>	<u>5.5</u>
<u>11:30</u> <u>12:00</u>	<u>30</u>	<u>60</u>	<u>6"</u>	<u>1/2</u>	<u>5 1/2</u>	<u>5.5</u>
<u>12:00</u> <u>12:30</u>	<u>30</u>	<u>90</u>	<u>6"</u>	<u>3/4</u>	<u>5 1/4</u>	<u>5.7</u>
<u>12:30</u> <u>1:00</u>	<u>30</u>	<u>120</u>	<u>6"</u>	<u>1"</u>	<u>5"</u>	<u>6"</u>
<u>1:00</u> <u>1:30</u>	<u>30</u>	<u>150</u>	<u>6"</u>	<u>1"</u>	<u>5"</u>	<u>6"</u>
<u>1:30</u> <u>2:00</u>	<u>30</u>	<u>180</u>	<u>6"</u>	<u>1"</u>	<u>5"</u>	<u>6"</u>
<u>2:00</u> <u>2:30</u>	<u>30</u>	<u>240</u>	<u>6"</u>	<u>1"</u>	<u>5"</u>	<u>6"</u>

Appendix 4

Leach Line Percolation Data Sheet

Project <u>Trademark</u>	Job No. <u>472 2002.01</u>
Test Hole No. <u>I-6</u>	Date Excavated: <u>1-30-2020</u>
Depth of Test Hole: <u>36"</u>	Soil Classification <u>SM-ML</u>
Check for Sandy Soil Criteria Tested by: <u>JPF</u>	Date: _____ Presoak: <u>1-30-2020</u>
Actual Percolation Tested by: <u>JPF</u>	Date: <u>1-31-2020</u>

Sandy Soil Criteria Test

Trial No.	Time	Time Interval (Min)	Initial Water Level (Inches)	Final Water Level (Inches)	▲ in Water Level (Inches)
<u>1</u>	<u>8:42</u> <u>9:07</u>	<u>25</u>	<u>6 1/4</u>	<u>1 1/2</u>	<u>4 1/2</u>
<u>2</u>	_____				

Use: Normal Sandy (Circle One) Soil Criteria

Time	Time Interval (Min)	Total Elapsed Time (Min)	Initial Water Level (Inches)	Final Water Level (Inches)	▲ in Water Level (Inches)	Percolation Rate (Min/Inch)
<u>11:05</u> <u>11:35</u>	<u>30</u>	<u>30</u>	<u>6"</u>	<u>1 3/4</u>	<u>4 1/4</u>	<u>7.1</u>
<u>11:35</u> <u>12:05</u>	<u>30</u>	<u>60</u>	<u>6"</u>	<u>1 3/4</u>	<u>4 1/4</u>	<u>7.1</u>
<u>12:05</u> <u>12:35</u>	<u>30</u>	<u>90</u>	<u>6"</u>	<u>2"</u>	<u>4"</u>	<u>7.5</u>
<u>12:35</u> <u>1:05</u>	<u>30</u>	<u>120</u>	<u>6"</u>	<u>2"</u>	<u>4"</u>	<u>7.5</u>
<u>1:05</u> <u>1:35</u>	<u>30</u>	<u>150</u>	<u>6"</u>	<u>2"</u>	<u>4"</u>	<u>7.5</u>
<u>1:35</u> <u>2:05</u>	<u>30</u>	<u>180</u>	<u>6"</u>	<u>2"</u>	<u>4"</u>	<u>7.5</u>
<u>2:05</u> <u>2:35</u>	<u>30</u>	<u>240</u>	<u>6"</u>	<u>2"</u>	<u>4"</u>	<u>7.5</u>

