Appendix G – La Quinta Village Hydrology Study

La Quinta Village Build-out Plan EIR City of La Quinta

LA QUINTA VILLAGE HYDROLOGY STUDY

IN SUPPORT OF THE LA QUINTA VILLAGE BUILD-OUT PLAN EIR

PREPARED FOR:
CITY OF LA QUINTA
78-495 CALLE TAMPICO
PALM DESERT, CA 92260

PREPARED BY:



THE ALTUM GROUP

73710 FRED WARING DRIVE PALM DESERT, CA 92260 (760) 346-4750

August 4, 2016



Prepared Under the Supervision of:

James R. Bazua, P.E.

R.C.E. 58394

Date

8/4/16

Exp. 12/31/16

LA QUINTA VILLAGE HYDROLOGY STUDY

IN SUPPORT OF THE LA QUINTA VILLAGE BUILD-OUT PLAN EIR

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I. PURPOSE AND SCOPE

This hydrology study has been prepared in support of the La Quinta Village Build-Out Plan EIR.

The La Quinta Village area studied in this report focuses on approximately 90 acres of land, generally located south of Calle Tampico, east of Eisenhower Drive and west of Desert Club Drive and is generally recognized as its traditional Downtown. City of La Quinta is undergoing a planning effort to develop a build-out scenario that addresses maximum potential commercial square footage while assuring that infrastructure is planned to accommodate build-out.

Traditionally, the downtown area has been developed without requiring on-site storm drain retention due to the commercial nature of the development. This study revisits that approach and compares impacts to the Downtown area due to future build-out of La Quinta Village area based on the 10 year storm event. Approximately 77 acres within the study area is currently developed and 13 acres are vacant. As this study is in support of the future commercial build-out of The La Quinta Village, the analysis will be limited to the increase in runoff volume due to the development of these vacant parcels.

II. DESIGN METHODOLGY

The La Quinta Village area is included within the boundaries of a Focused Drainage Study prepared by Michael Baker, Inc. for a portion of City of La Quinta. While the original intent of this study was to tier off of the report prepared by Michael Baker, Inc. which analyzes the 100 year storm event for a much larger area, it appears that portions of the Downtown Area Drainage Study prepared by Psomas in 2008 for City of La Quinta are more suitable to use as reference here since the Psomas report also targets the effects of the 10 year storm event for the same study area used in this report. The Psomas Downtown Area Drainage Study is included as Appendix F of the City of La Quinta's Master Draiunage Plan

The results contained in this drainage study can be separated into two sets of data that can be used for comparison. The data is generated by 1.) analyzing the anticipated maximum storm runoff volume generated on each vacant commercial site within the study area during the 10 year storm event and 2.) calculating the increase in runoff discharge due to development of the vacant parcels within the study area.

Runoff discharge calculations contained in this report were developed using Rational Method (Riverside County) software by CivilCADD/CivilDesign, and the anticipated runoff volumes were calculated using Riverside County Flood Control District (RCFCD) Synthetic Unit Hydrograph (Short-cut Method) for the 10 year storm event. The topographic data used in this study was prepared by the Federal Emergency Management Agency in 2011 and provided for use by City of La Quinta.

III. DESIGN CRITERIA

The following design parameters were used in the preparation of the analyses:

- 10 Year Storm Event **Antecedent Moisture Condition** 1 10 year - 3 hour precipitation1.14 (NOAA ATLAS 14) 10 year – 6 hour precipitation (NOAA ATLAS 14) 1.46 • 10 year – 24 hour precipitation (NOAA ATLAS 14) 2.37 • 2 year – 1 hour precipitation (NOAA ATLAS 14) 0.38 • 100 year – 1 hour precipitation (NOAA ATLAS 14) 1.69 Slope Intensity Duration Curve (RCFCD Plate D-4.6) 0.59
- Hydraulic Soil Type 'A' (previously graded with relatively low potential for infiltration)

IV. ON-SITE RETENTION ANALYSIS

Several undeveloped parcels designated for commercial use within the La Quinta Village area were studied separately to determine the on-site retention volume capacity that would be required in order to capture 100% of the 10 year event (see APPENDIX "10 YEAR ON-SITE RETENTION STUDY MAP" and RCFCD Synthetic Unit Hydrograph Worksheets)

Each of the commercial parcels that were studied share similar topographic features in that they have less than minimum allowable fall in order to facilitate surface drainage. For the purposes of the analysis, it is assumed that a sufficient gradient will be provided in order to achieve positive surface flow and 90% impervious lot coverage will exist under the developed condition.

Since the undeveloped parcels within the La Quinta Village Study Area share similar characteristic, the results of the on-site retention study can be tabulated and averaged to produce a representative retention basin footprint size per acre of commercial development. The resulting value can be then be evaluated based on its feasibility on a lot by lot basis.

Build-out of the vacant commercial developments within the La Quinta Village would require approximately 2,200 sq.ft/acre designated for retention basin use in order to capture the on-site runoff generated during the 10 year storm event.

V. STREET CAPACITY ANALYSIS

Vacant parcels designated for commercial development within La Quinta Village were identified and studied to determine the runoff discharge tributary to each vacant parcel under the existing-vacant condition as well as the projected commercially developed condition. The results were compared for all vacant commercial parcels in order to determine the increase in runoff due to 100% buildout within La Quinta Village (see APPENDIX "10 YEAR DISCHARGE STUDY MAP" and Riverside County Rational Method Worksheets)

The total additional runoff generated by commercial development of existing vacant lots within La Quinta Village during the 10 year rain event is 9.89 cfs occurring along Calle Tampico where flows combine creating the worst case condition.

Based on the Psomas Downtown Area Drainage Report, the downtown area is subject to flooding under the existing condition in the northern reaches of Avenida Bermudas, Desert Club Drive and all along Calle Tampico. Existing catch basins along Calle Tampico and the underground storm drain pipe network do not have the capacity to convey the 10-year peak storm runoff from the downtown area and adjacent neighborhood. Existing studies calculate runoff tributary to Calle Tampico during the 10 year peak storm event by combining 71 cfs from the area west of Avenida Bermudas with 41.5 cfs generated between Avenida Bermudas and Desert Club Drive for a total of 112.5 cfs under the existing condition. Development of the existing vacant parcels within the study area for commercial use increases the discharge along Calle Tampico by 8.8%.

10 YEAR EVENT - INCREASE IN RUNOFF DUE TO DEVELOPMENT

SUBAREA	AREA (ac.)	PRE-DEVELOPMENT DISCHARGE (Q10 CFS)	POST DEVELOPMENT DISCHARGE (Q10 CFS)
(1)	0.36	0.49	0.85
②	0.78	1.20	2.03
② ③ ⑤	0.65	0.94	1.61
4	1.73	2.31	4.00
(5)	0.92	1.47	2.47
6	0.11	0.21	0.34
Ō	0.35	0.55	0.93
8	0.35	0.56	0.94
9	0.79	1.24	2.09
<u>(10</u>	1.16	1.70	2.89
Ŏ	1.21	1.63	2.82
<u>(12</u>)	0.58	0.90	1.52
13	0.57	0.87	1.47
		14.07	23.96

9.89 CFS

VI. RECOMMENDATIONS

The results of the analyses contained in this report suggest that the level of impingement to commercial development in order to retain 10 year flows on site is large relative to the expected increase in surface street runoff due to development of existing vacant lots within La Quinta Village.

Since on-site streets and storm drain facilities along Calle Tampico already do not have full capacity to convey 10 year storm runoff under the existing condition, and the increase in runoff due to development of the existing vacant parcels is relatively small, it is our recommendation that an "drainage mitigation" development fee should be required to supplement funding for upgrades to the existing storm drain evacuation system.

The use of an off-site retention basin designed to capture flows generated during the 10 year storm event has been suggested as a possible design solution and involves the need for existing surface streets and storm drain facilities to provide conveyance to an off-site location when they are already beyond capacity under the existing condition. This would seem to reinforce the opinion that a drainage mitigation fee intended to upgrade existing facilities is warranted

VII REFERENCES

Michael Baker International (February 2016) <u>City of La Quinta Focused Area</u> <u>Drainage Study</u>

Psomas (January 2008) <u>Downtown Area Drainage Study for City of La Quinta</u>

Riverside County Flood Control and Water Conservation District (April 1978) *Hydrology Manual*

VIII APPENDIX



NOAA Atlas 14, Volume 6, Version 2 Location name: La Quinta, California, US* Latitude: 33.6760°, Longitude: -116.3040° Elevation: 46 ft*

Elevation: 46 ft*
* source: Google Maps



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

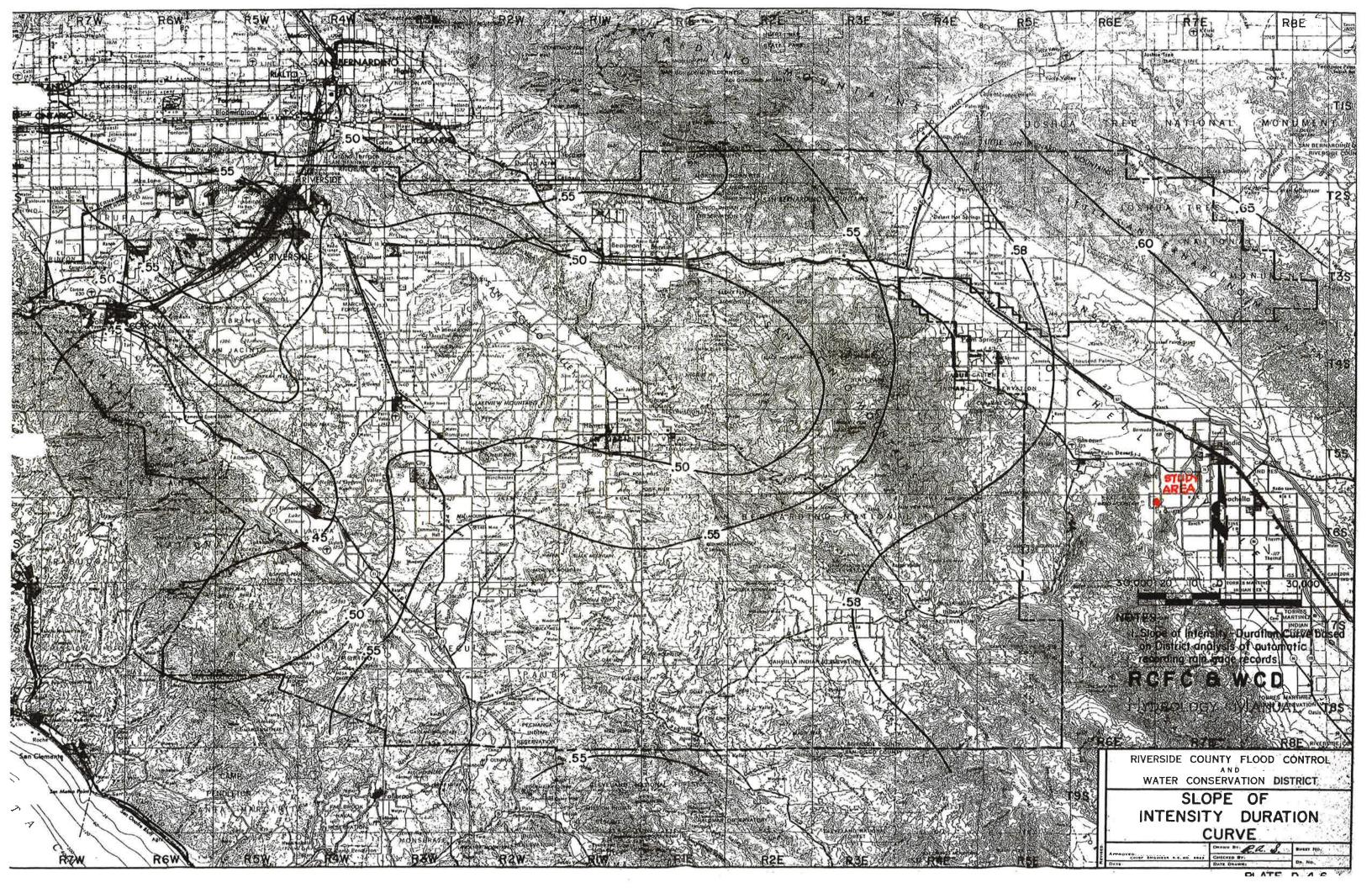
Duration				Averag	e recurrenc	e interval (y	ears)			
Duration	1	2	5	10	25	50	100	200	500	1000
5-min	0.070 (0.058-0.084)	0.107 (0.089-0.129)	0.164 (0.136-0.199)	0.217 (0.179-0.266)	0.302 (0.241-0.383)	0.379 (0.296-0.491)	0.469 (0.356-0.622)	0.575 (0.425-0.786)	0.745 (0.528-1.06)	0.904 (0.618-1.34
10-min	0.100 (0.083-0.121)	0.153 (0.128-0.185)	0.235 (0.195-0.285)	0.311 (0.256-0.381)	0.433 (0.345-0.549)	0.543 (0.424-0.704)	0.672 (0.511-0.892)	0.824 (0.609-1.13)	1.07 (0.757-1.52)	1.30 (0.886-1.92
15-min	0.121 (0.101-0.146)	0.185 (0.154-0.224)	0.284 (0.236-0.345)	0.376 (0.310-0.461)	0.524 (0.417-0.664)	0.657 (0.512-0.851)	0.812 (0.618-1.08)	0.996 (0.736-1,36)	1.29 (0.915-1.84)	1.57 (1.07-2.32
30-min	0.177 (0.148-0.214)	0.272 (0.227-0.329)	0.417 (0.346-0.506)	0.552 (0.455-0.677)	0.769 (0.613-0.975)	0.965 (0.752-1.25)	1.19 (0.907-1.58)	1.46 (1.08-2,00)	1.90 (1.34-2.71)	2.30 (1.57-3.40
60-min	0.251 (0.209-0.303)	0.384 (0.320-0.465)	0.589 (0.490-0.715)	0.781 (0.644-0.957)	1.09 (0.867-1.38)	1.36 (1.06-1.77)	1.69 (1.28-2.24)	2.07 (1,53-2,83)	2.68 (1.90-3.83)	3.25 (2.22-4.81
2-hr	0.349 (0.291-0.422)	0.510 (0.426-0.618)	0.758 (0:630-0.920)	0.988 (0.815-1.21)	1.35 (1.08-1.71)	1.68 (1.31-2.17)	2.05 (1,56-2,72)	2.49 (1,84-3,40)	3.17 (2.25-4.53)	3.80 (2.60-5.61)
3-hr	0.416 (0.347-0.503)	0.600 (0.501-0.727)	0.881 (0.732-1.07)	1.14 (0.941-1.40)	1.55 (1.24-1.97)	1.91 (1.49-2.48)	2.33 (1.77-3.10)	2.81 (2.08-3.85)	3.57 (2.53-5.09)	4.25 (2.90-6.28
6-hr	0.543 (0.454-0.657)	0.779 (0.649-0.943)	1.13 (0.942-1.38)	1.46 (1.20-1.79)	1.97 (1.57-2.49)	2.41 (1.88-3.12)	2.92 (2.22-3.87)	3.50 (2.58-4.78)	4.40 (3.12-6.28)	5.20 (3.55-7.68
12-hr	0.659 (0.550-0.797)	0.967 (0.806-1.17)	1.42 (1.18-1.73)	1.83 (1.51-2.25)	2.46 (1.96-3.12)	3.01 (2.34-3.89)	3.62 (2.75-4.80)	4.31 (3.18-5.89)	5.36 (3.79-7.64)	6.27 (4.29-9.27
24-hr	0.811 (0.718-0.935)	1.23 (1.08-1.42)	1.83 (1.61-2.12)	2.37 (2.07-2.76)	3.18 (2.69-3.83)	3.87 (3.21-4.75)	4.63 (3.75-5.82)	5.49 (4.33-7.09)	6.77 (5.14-9,11)	7.87 (5.78-10.9
2-day	0.934 (0.826-1.08)	1.43 (1,27-1.66)	2.16 (1.90-2.50)	2.80 (2.45-3.27)	3.77 (3.19-4.54)	4.58 (3.81-5,63)	5.48 (4.45-6.90)	6.49 (5.13-8.39)	7.99 (6,07-10.8)	9.28 (6,81-12.9
3-day	1.00 (0.885-1.15)	1.54 (1.37-1.78)	2.34 (2.06-2.71)	3.04 (2.66-3.55)	4.09 (3.47-4.93)	4.98 (4.14-6.13)	5.97 (4.84-7.51)	7.07 (5.58-9.14)	8.72 (6.61-11.7)	10.1 (7,43-14.1
4-day	1.06 (0.940-1.23)	1.64 (1.45-1.90)	2.49 (2.19-2.88)	3.24 (2.83-3.78)	4.36 (3.69-5.25)	5.31 (4.41-6.52)	6.36 (5.16-8.00)	7.53 (5.95-9.73)	9.29 (7.05-12.5)	10.8 (7.92-15.0
7-day	1.13 (0,998-1,30)	1.74 (1.54-2.01)	2.64 (2.32-3.05)	3.43 (3.00-4.00)	4.62 (3.91-5.56)	5.62 (4.66-6.90)	6.72 (5.45-8.45)	7.94 (6.27-10.3)	9.77 (7.41-13.1)	11.3 (8,31-15,7
10-day	1.16 (1.02-1.34)	1.79 (1.58-2.07)	2.72 (2.39-3.14)	3.54 (3.09-4.12)	4.76 (4.03-5.73)	5.79 (4.80-7.11)	6.91 (5.61-8.70)	8. 16 (6.45-10.6)	10.0 (7.61-13.5)	11.6 (8.51-16.1
20-day	1.24 (1.10-1.43)	1.95 (1.73-2.25)	2.99 (2.63-3.46)	3.90 (3.41-4.55)	5.27 (4.46-6.34)	6.41 (5.32-7.88)	7.66 (6,21-9,63)	9.03 (7.13-11.7)	11.0 (8,37-14,8)	12.7 (9.32-17.7
30-day	1.32 (1.17-1.53)	2.11 (1.87-2.44)	3.27 (2.88-3.79)	4.29 (3.76-5.01)	5.82 (4.93-7.01)	7.09 (5.89-8.72)	8.47 (6.87-10.7)	9.97 (7.87-12.9)	12.1 (9.21-16.3)	13.9 (10.2-19.4
45-day	1.43 (1.26-1.65)	2.33 (2.06-2.69)	3.63 (3.20-4.21)	4.80 (4.20-5.60)	6.53 (5.54-7.87)	7.98 (6.63-9.80)	9.53 (7.73-12.0)	11.2 (8.85-14.5)	13.6 (10.3-18.3)	15.6 (11.4-21.7
60-day	1.51 (1.34-1.75)	2.50 (2.21-2.89)	3.96 (3.49-4.58)	5.25 (4.59-6.12)	7.16 (6.07-8.63)	8.76 (7.27-10.8)	10.5 (8.49-13.2)	12.3 (9.71-15.9)	14.9 (11.3-20.1)	17.0 (12.5-23.7

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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RCFCD SYNTHETIC UNIT HYDROGRAPH WORSHEETS

IO YR EVENT - I HOUR VOLUMÉ HYDROLOGY CALCULATIONS - s Sample

Using the RCFC&WCD Short Cut Unit Hydrograph Method Area Designations La Quinta Village - 1

Area Designations

90
0.07 (used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per plate E-1.1 (3 of 6))
90
0 60 24 2.37 ÷ 5 5 4. 0.61 15 1 3 0.78 1.14 A 32 0.375 (AMC II) AMC index II Runoff Number (plate E-6.1)
Plate E-6.2 Pervious Araa Loss Rate (Fp)(in/hr)
Percentage of Impervious Cover (A)(%) (plate E-6.3) Weighted Average Loss Rate (F=Fp(1-.9Ai))(in./hr.) 10 Year Storm Duration (hrs)
Total Precipitation (From Plates E-5.2, 5.4, 5.6)(in.) Low Loss Rate Percent (%) Retention Basin Percolation Rate (in/hr) Drainage Area (ac.) Unit time (minutes) Soils Group

73570.23 (d/3)*(bottom+top+(bottom*top)*0.50) (values must be non-zero or error occurs) Percolation is taken incrementally.

Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used

(Drywell can be "zeroed out" by reducing numbers to 0.001 or less, but should not be entered with 0 or program chokes.)

Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper/Pt)(1'diam/2/^2+f)("(diam/2)^2+0.4"((diam/2+1.3333)^2-(diam/2+0.3333)^2-(d Max. storage≍ h=(vol*3)/(bottom+top+(bottom*top)^0.5) Max. Depth (d)= 10000 s.f. area=bottom+(h/d)*(top-bottom) Bot = 20000 s.f. vol=(h/3)*(bottom+top+(bottom*top)*0.50) Top = Outside Input from: Ret. Basin design (area, depth) Formulas vol=(h/3)*(bottom Drywell design factors

0.00

0.00 Upper max.(cf)= 0.00

	Overflow	Rate (cfs)	0.00	0.00	0.00	00'0	0.00	0.00	0.00	0.00	0.00	00'0	00'0	0.00	0.00	0.00	0.00	0.00	00'0	0.00	0.00	0.00
	Overflow Ov	Vol. (cf) Re	00.00	0.00	00.00	0.00	0.00	00.00	00.00	0.00	0.00	0.00	00.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	00.00	00'00
Basin	Storage Ov	Depth (ff) Vo	0.01	0.03	90'0	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0,11	0.11	0.11
Basin E	Storage	Vol. (cf)	193,83	476.74	946.35	1556.41	1556,41	1556.41	1556.41	1556,41	1556.41	1556,41	1556.41	1556.41	1556.41	1556,41	1556.41	1556.41	1556.41	1556.41	1556.41	1556,41
_	Period St	Perc. (cf) Vo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	00.00	0.00	0.00	0.00	0.00	0.00	0.00	00.00	0.00
	Retention	Area (sf)	10000,00	10026,35	10064.80	10128.63	10211.55	10211.55	10211.55	10211.55	10211.55	10211,55	10211.55	10211.55	10211,55	10211.55	10211.55	10211.55	10211.55	10211,55	10211.55	10211,55
Overflow	To F	Basin (cf) A	193.83	282.91	469.61	610.07	0.00	0.00	00'0	00'0	0.00	0.00	0.00	0.00	0.00	0.00	00.00	00'0	00'0	00'0	000	0.00
Drywell	Storage	Depth (ft)	00'0	0.00	0.00	0.00	0.00	0.00	00.00	00.00	0.00	0.00	00'0	0.00	0.00	0.00	00.0	0.00	0.00	0.00	0.00	0.00
Drywell [Storage S	_	00.00	00'0	00.00	00.00	00.0	00.0	0.00	00'0	00.00	00.00	00.0	00.0	00.00	0.00	0.00	00.00	00'0	00.0	00.0	00'0
Drywell			0.00	00.00	00.0	0.00	00.00	0.00	0.00	0.00	0,00	0.00	0.00	0.00	0.00	0.00	0.00	00.00	0.00	0.00	0.00	0.00
Drywell	5	Area (sf)	\sim		0.00	0.00	00.00	0.00	0.00	0.00	00.00	00.00	0.00	00:0	00.00	00.0	000	0.00	0.00	0.00	00:00	0.00
	Outside	Input (cf)	0.00	0.00	00'0	0.00	0.00	0.00	0.00	0.00	0.00	00.00	0.00	0.00	0.00	00.0	0.00	0.00	0.00	0.00	00'0	00.00
	Flow Outs	(F)	193.84	282.91	469.61	610.07	00.00	0.00	0.00	0.00	0.00	0.00	0.00	00.00	0.00	0.00	00.00	0.00	0.00	00.00	00'0	0.00
	Flow Flo	Rate (cfs) Vo	0.2154	0.3143	0.5218	0.6779	00000	0.000.0	0,0000	0.0000	0.0000	0,000,0	0.0000	0.0000	0,0000	0.0000	0.0000	000000	0.0000	0.0000	0.0000	0.0000
	Effective FI	Rain (in/hr) R	0,3531	0.5153	0.8554	1,1112	0,0000	0.0000	0.0000	0.0000	0.0000	00000	0.0000	0.0000	0.0000	0.0000	0.0000	0,0000	0,0000	0.0000	00000	0.0000
							00'0	0.00	0.00	0.00	0.00	0.00	00.00	0.00	00.00	00.00	0.00	00.0	0.00	0.00	0.00	00.00
nts	Loss Rate Value	Max. Min.	0.0713 N/A	0.0713 N/A	0.0713 N/A	0.0713 N/A	0.0713	0.0713	0.0713	0.0713	0,0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713
ite incremei	Storm	Rain (in/hr) N	0.4243	0.5866	0.9266	1.1825	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0 0000	00000
n 15 min.	Pattern	%	13.6	18.8	29.7	37.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1 Hour Storm in 15 minute increments	Time		0:15	0:30	0:45	1:00				2				3				4				5

	l A	B C D
1	RCFCD SYNTHETIC UNIT HYDROGRAPH	
2	DATA INPUT SHEET	
3	DATA IN OT SHEET	
4	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.
5	THE THE BY	ormed in orient,
6	PROJECT NAME	LA QUINTA VILLAGE -1
7		C1200
8		
9	CONCENTRATION POINT DESIGNATION	
	AREA DESIGNATION	ON-SITE .
11		
	TRIBUTARY AREAS	ACRES
13	COMMEDICAL	0.04
	COMMERCIAL PAVING/HARDSCAPE	0.61
	SF - 1 ACRE	
	SF - 1/2 ACRE	
	SF - 1/4 ACRE	
	MF - CONDOMINIUMS	
	MF - APARTMENTS	
	MOBILE HOME PARK	
	LANDSCAPING	A STATE OF THE STA
	RETENTION BASIN	
	GOLF COURSE	Market Edition of
	MOUNTAINOUS	
	LOW LOSS RATE (PERCENT)	90%
27	LENGTH OF MATEROOURGE (L)	044
	LENGTH OF WATERCOURSE (L) LENGTH TO POINT OPPOSITE CENTROID (Lca)	311 120
30	LENGTH TO POINT OPPOSITE CENTROID (LCa)	120
	ELEVATION OF HEADWATER	52
	ELEVATION OF CONCENTRATION POINT	50.5
33		
	AVERAGE MANNINGS 'N' VALUE	0.02
35		
	STORM FREQUENCY (YEAR)	10
37		
	POINT RAIN	
	3-HOUR	1.14
	6-HOUR 24-HOUR	1.46 2.37
41	24-noun	2.37
	BASIN CHARACTERISTICS:	ELEVATION AREA
44	Bridit Of Mario El Horioo.	ELEVATION TOTAL
45		
46		
47		
48		
49		
50		
51	DEDOCLATION BATE (* #)	
	PERCOLATION RATE (in/hr)	0
53	DDVMELL DATA	
	DRYWELL DATA NUMBER USED	
	PERCOLATION RATE (cfs)	
00	TEHOOLATION HATE (CIS)	

RCFCD 8	SYNTHE	FIC UNIT	HYDRO	RAPH M	ETHOD	PROJECT:	LA QUINTA	VILLAGE -1			
BASIC DA	TA CALCU	ILATION FO	ORM				C1200				
SHORTCUT	METHOD					BY	ES R. BAZUA	A, P.E.	DATE	7/26/2016	
					PHYSIC	AL DATA					
[1] CONCEN	TRATION PO	TAIC							1		
[2] AREA DE								ON-	SITE		
3) AREA - A	CRES								310		
(4) L-FEET									11		
[5] L-MILES									059		
6] La-FEET									0.00		
[7] La-MILES									023		
8 ELEVATION									52		
	ON OF CONC	CENTRATION	POINT						0.5		
(10) H-FEET									.5		
[11] S-FEET/	MILE								5.5		
[12] S^0.5									05		
[13] L'LCA/S		VO (1)							000		
[14] AVERAC [15] LAG TIM		IS N							02		
16 LAG TIM						-			.3		
17] 100% OF	A PROPERTY OF THE PARTY OF THE	ree							.3		
[18] 200% OF									.5		
		(100%-200%	OFTAG						5		
		ON RATE (cfs							00		
ENTIONALI	LITOULTING	ATTITUE (GIO			DAINEA	LL DATA					
1] SOURCE					DAINTA	LL DATA					
2] FREQUE	UCV-VEADS	10									
3] DURATIO		10									
		URS			6-HC	DURS			24-H0	OURS	
[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
POINT	AREA		AVERAGE	POINT	AREA		AVERAGE	POINT	AREA		AVERAG
RAIN			POINT	RAIN			POINT	PAIN			POINT
INCHES			RAIN	INCHES			RAIN	INCHES			RAIN
Plate E-5.2)			INCHES	(Plate E-5.4)			INCHES	(Plate E-5.6)			INCHES
1.14	0.610	1.00	1.14	1.46	0.610	1.00			0.610	1.00	2.
		0.00	0.00			0.00				0.00	0.
		0.00	0.00			0.00				0.00	0.
		0.00	0.00			0.00				0.00	0.
SUM [5]		SUM [7]		SUM [9]	0.61	SUM [11]		SUM [13]	0.61	SUM [15]	2.
16] AREA AL		.,	1.000				1.000			1	1.0
17] ADJ AVG	POINT RAI	V	1.14				1.46				2.

STO	RM EVEI	NT SUMM	ARY	
DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE HAIN	(in)	0.72	0.69	0.70
FLOOD VOLUME	(cu-ft) (acre-ft)	1,603 0.04	1,536 0.04	1,551 0.04
REQUIRED STORAGE	(cu-ft) (acre-ft)	1,589 0.04	1,523 0.03	1,538 0.04
PEAK FLOW	(cfs)	0.60	0.51	0.12
MAXIMUM WSEL	(ft)	10.		-

10 YR EVELT - I HOUR VOLUME HYDROLOGY CALCULATIONS - s Sample

Using the RCFC&WCD Short Cut Unit Hydrograph Method La Quinta Village - 2 Area Designations

90 0.07 (used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per plate E-1.1 (3 of 6)) 60 24 2.37 25 o 54. € £ ± 0.375 (AMC II) 0.78 Percentage of Impervious Cover (Ai)(%) (plate E-6.3) Total Precipitation (From Plates E-5.2, 5.4, 5.6)(in.) Weighted Average Loss Rate (F=Fp(1-.9Ai))(in./hr.) Plate E-6.2 Pervious Area Loss Rate (Fp)(in/hr) AMC index II Runoff Number (plate E-6.1) Retention Basin Percolation Rate (in/hr) 10 Year Storm Duration (hrs) Low Loss Rate Percent (%) Drainage Area (ac.) Unit time (minutes) Soils Group

Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used Percolation is taken incrementally.

(d/3)*(bottom+top+(bottom*top)^0.50) (values must be non-zero or error occurs) 73570.23 Drywell lower max. (cf)= (Drywell can be "zeroed out" by reducing numbers to 0.001 or less, but should not be entered with 0 or program chokes.)

Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*PI()*(diam/2)*Z+(lower)*PI()*(diam/2)*2+0.4'((diam/2+1.3333)*2-(diam/2+0.3333)*2) Drywell total(cf)= Max. storage= h=(vol*3)/(bottom+top+(bottom*top)^0.5) S Ring diam. (ft.) = Max. Depth (d)= 10000 s.f. area=bottom+(h/d)*(top-bottom) Lower sec. (ft.)= Bot. = 20000 s.f. 0.001 vol=(h/3)*(bottom+top+(bottom*top)^0,50) Upper sec. (ft.)= Top ≈ Outside input from: Ret. Basin design (area, depth) Drywell design factors Formulas

0.00

0.00 Upper max.(cf)=

0.00 Rate (cfs) Overflow 0.00 0.00 00'0 Storage Overflow Depth (ft) Vol. (cf) 0.03 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 0.09 422.03 837.75 1377.81 1377.81 1377.81 1377.81 1377.81 1377.81 1377.81 1377.81 1377.81 1377.81 1377.81 1377.81 1377.81 1377.81 1377.81 Storage Vol. (cf) Basin 00.00 0.00 0.00 Perc. (cf) Period Basin 10113.87 10187.28 10187.28 10187.28 10187.28 10187.28 10187.28 10187.28 10000.00 10023.32 10057,36 10187,28 10187.28 10187.28 10187.28 10187.28 10187.28 10187.28 10187.28 Retention Basin (cf) Area (sf) 171.59 250.44 415.72 540.06 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Overflow 0.00 0000 000 0.00 0.00 0.00 0000 Perc. (cf) Vot. (cf) Depth (ft) Storage Storage Drywell Drywell Drywell 0.00 0.00 0.00 0.00 0.00 0.00 0.00 Retention Period 0.00 0.00 0.00 Area (sf) 0.00 99999999999 0.00 Input (ci) Outside 171.59 250.44 415.72 540.06 0.00 0.00 0.00 0.00 0.00 00'0 Vol. (cf) Flow 0.2783 0.4619 0.6001 0.0000 0.0000 0,0000 0.1907 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.000.0 Rain (in/hr) Rate (cfs) Flow 0.8554 00000 00000 0.0000 0.0000 0.0000 0.5153 0.000.0 0.000.0 0.000.0 0.000.0 0,0000 000000 000000 0.0000 0.000.0 0.3531 Effective 0000 000 0.00 0000 00'0 Loss Rate Value 0.0713 N/A 0.0713 N/A 0.0713 N/A 0.0713 N/A 0.0713 Min. 0.0713 0.0713 0.0713 0.0713 0.0713 0.0713 0.0713 0.0713 0.0713 0.0713 0.0713 0.0713 Rain (in/hr) Max. 1 Hour Storm in 15 minute increments 0.5866 0.5866 0.9266 1.1825 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0,0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 Storm 13.6 18.8 29.7 37.9 0:15 0:30 0:45 1:00 ψ'n

	I A	B C D
1	RCFCD SYNTHETIC UNIT HYDROGRAPH	
2	DATA INPUT SHEET	
3	WORKSHEET DREDADED BY.	TAMES D. DAZUA D.E.
5	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.
	DDO IECT NAME	LA QUINTA VIII AGE O
7	PROJECT NAME	LA QUINTA VILLAGE - 2
8		C1200
	CONCENTRATION POINT DESIGNATION	
	AREA DESIGNATION	ON CITE
11	ANEA DESIGNATION	ON-SITE ON-SITE
	TRIBUTARY AREAS	ACRES
13		ACRES
	COMMERCIAL	0.54
	PAVING/HARDSCAPE	0.34
	SF - 1 ACRE	
	SF - 1/2 ACRE	
	SF - 1/4 ACRE	
	MF - CONDOMINIUMS	
	MF - APARTMENTS	
	MOBILE HOME PARK	
	LANDSCAPING	
23	RETENTION BASIN	
24	GOLF COURSE	
25	MOUNTAINOUS	
	LOW LOSS RATE (PERCENT)	90%
27		
28	LENGTH OF WATERCOURSE (L)	276
	LENGTH TO POINT OPPOSITE CENTROID (Lca)	100
30	ELEVATION OF LIEADINATED	
	ELEVATION OF HEADWATER	51.5
33	ELEVATION OF CONCENTRATION POINT	50
	AVERAGE MANNINGS 'N' VALUE	0.02
35	AVEITAGE MANNINGS IN VALUE	0.02
	STORM FREQUENCY (YEAR)	10
37	o i o i i i i i i i i i i i i i i i i i	10
	POINT RAIN	
	3-HOUR	1.14
	6-HOUR	1.46
41	24-HOUR	2.37
42		
	BASIN CHARACTERISTICS:	ELEVATION AREA
44		
45		
46		
47		
48		
49	0-0	
50 51		
	PERCOLATION RATE (in/hr)	0
53	LINOLATION HATE (III/III)	U
	DRYWELL DATA	
	NUMBER USED	
	PERCOLATION RATE (cfs)	
90	- Literation and the Land	

RCFCD {	SYNTHE	FIC UNIT	HYDRO	RAPH M	ETHOD	PROJECT:	LA QUINTA	VILLAGE - 2			
BASIC DA	TA CALCU	LATION FO	ORM				C1200				
SHORTCUT	METHOD					BY	ES R. BAZUA	A, P.E.	DATE	7/26/2016	
					PHYSIC	AL DATA					
1] CONCEN	TRATION PO	INT							1		
2) AREA DE	SIGNATION							ON-	SITE		
3] AREA - A	CRES							0.5	i40		
4] L-FEET								27	76		
5] L-MILES								0.0	52		
6] La-FEET								100	0.00		
7] La-MILES								0.0	19		
8) ELEVATION	ON OF HEAD	WATER						51	.5		
9] ELEVATION	ON OF CONC	ENTRATION	POINT					5	0		
10] H-FEET								1	.5		
111 S-FEET/	MILE							28			
[12] S^0.5								5.			
[13] L*LCA/S	^0.5							0.0			
	BE MANNING	S'N'						0.0			
15] LAG TIM								0.	02		
16] LAG TIM	E-MINUTES							1.			
	LAG-MINUT							1			
	LAG-MINUT							2			
		(100%-200%							i		
[24] TOTAL F	PERCOLATIO	N RATE (cfs)					0.0	00		
					RAINFA	LL DATA					
1] SOURCE											
2] FREQUE	NCY-YEARS	10									
3] DURATIO	N:										
	3-HC	URS			6-HC	OURS			24-H0	DURS	
[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
POINT	AREA		AVERAGE	POINT	AREA		AVERAGE	POINT	AREA		AVERAG
RAIN) li	POINT	RAIN			POINT	RAIN			POINT
INCHES			RAIN	INCHES			RAIN	INCHES			RAIN
(Plate E-5.2)			INCHES	(Plate E-5.4)			INCHES	(Plate E-5.6)			INCHES
1.14	0.540	1.00	1.14	1.46	0.540	1.00			0.540	1.00	2.:
		0.00	0,00			0.00				0.00	0.
		0.00	0.00	1.		0.00				0.00	0.
		0.00	0.00			0.00				0.00	0.
SUM [5]		SUM [7]		SUM [9]	0.54	SUM [11]		SUM [13]	0.54	SUM [15]	2.:
16] AREA A			1.000				1.000			170 0000	1.00
17] ADJ AVO	POINT RAIL	V	1.14				1.46				2.3

STO	RM EVE	NT SUMM	ARY	
DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0,72	0.69	0.70
FLOOD VOLUME	(cu-ft) (acre-ft)	1,419 0.03	1,359 0.03	1,373 0.03
REQUIRED STORAGE	(cu-ft) (acre-ft)	1,407 0.03	1,348 0.03	1,362 0.03
PEAK FLOW	(cfs)	0.53	0.45	0.11
MAXIMUM WSEL	(ft)			320

HYDROLOGY CALCULATIONS - 8 Sample 10 YR EVENT - 1 HOUR VOLUME

Using the RCFC&WCD Short Cut Unit Hydrograph Method

Area Designations La Quinta Village - 3

90 0.07 (used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per plate E-1.1 (3 of 6)) 60 2.37 E 4 A 32 0.375 (AMC II) Percentage of Impervious Cover (Ai)(%) (plate E-6.3) Total Precipitation (From Plates E-5.2, 54, 56)(in.) Weighted Average Loss Rate (F=Fp(1-.9Ai))(in./hr.) Percolation is taken incrementally. Plate E-6.2 Pervious Area Loss Rate (Fp)(in/hr) AMC index II Runoff Number (plate E-6.1) Retention Basin Percolation Rate (in/hr) 10 Year Storm Duration (hrs.) Low Loss Rate Percent (%) Drainage Area (ac.) Unit time (minutes) Soils Group

Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used (Drywell can be "zeroed out" by reducing numbers to 0.001 or less, but should not be entered with 0 or program chokes.)

0.00 Upper max.(cf)= 73570.23 (d/3)*(bottom+fop+(bottom*top)^0.50) (values must be non-zero or error occurs) Drywell lower max. (cf)= Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*P()*(diam/2)*2+(ldiam/2)*2+(diam/2)*2+0.4'(diam Drywell total(cf)= Max. storage= h=(vol*3)/(bottom+top+(bottom*top)^0.5) Ring diam. (R.) = Max. Depth (d)= 10000 s.f. area=bottom+(h/d)*(top-bottom) Lower sec. (ft.)= Bot. = 20000 s.f. 0.00 vol=(h/3)*(bottom+top+(bottom*top)^0.50) Upper sec. (ft.)= Top ≈ Outside input from: Ret. Basin design (area, depth) Drywell design factors Formulas

0.00

Rate (cfs) Overflow Storage Overflow Depth (ft) Vol. (cf) 1008.40 **1658.47** 1658.47 1658.47 1658.47 1658.47 1658.47 508.00 1658.47 1658.47 1658.47 1658.47 1658.47 1658.47 1658.47 1658,47 1658.47 Storage Perc. (cf) Vol. (cf) Basin Period 100000.00 10225,43 10225.43 10225.43 10225.43 10225,43 10225.43 10225,43 10225,43 10225.43 10225.43 10225.43 10225.43 10225.43 10225.43 10225.43 10028,07 10069.05 10137.07 Retention Basin (cf) Area (sf) 206.54 301,46 500.40 0.00 00'0 0.00 0.00 0.00 00.00 0.00 0.00 0.00 Perc. (cf) Vol. (cf) Depth (ft) 0.00 0.00 0.00 0.00 Storage Storage Drywell Drywell 0.00 0.00 Drywell Retention Period 0.00 0.00 0.00 0.00 Area (st) Drywell 0.000 Input (cf) Outside 206.55 301.46 500.40 650.07 0.00 0.00 0.00 0.00 0.00 0.00 00.0 0.00 Rain (in/hr) Rate (cfs) Vol. (cf) 0.5560 0.7223 0.0000 0.3350 0.0000 0.0000 0.0000 0,000,0 0.000.0 0.000.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0,0000 0,0000 0,5153 1,1112 0.0000 00000 0.0000 0.0000 0.0000 00000 000000 0.0000 0.0000 0.0000 0.0000 0.0000 0,0000 0.3531 Effective 0.00 000000 0.00 Loss Rate Value 0.0713 N/A 0.0713 N/A 0.0713 N/A 0.0713 N/A Σ 0.0713 0.0713 0 0713 0.0713 0.0713 0.0713 0.0713 0,0713 0.0713 0.0713 0,0713 0.0713 0.0713 0.0713 0.0713 Rain (in/hr) Max. 1 Hour Storm in 15 minute increments 1.1825 0.0000 0.0000 0.9266 0.000 0.0000 0.0000 0.4243 0.5866 0.0000 0.0000 0.0000 0,0000 0.000.0 0.000.0 0.0000 0.000.0 18 8 29.7 37.9 0000000000000 0:15 0:30 0:45

	A	I B C D
1	RCFCD SYNTHETIC UNIT HYDROGRAPH	
	DATA INPUT SHEET	
3	WORKSHEET SPERANER BY	TANKE OF THE PER
	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.
5		
	PROJECT NAME	LA QUINTA VILLAGE - 3
7		C1200
8	CONSENTE LEION BOINE DECICIONE	
	CONCENTRATION POINT DESIGNATION	
-	AREA DESIGNATION	ON-SITE
11		10000
	TRIBUTARY AREAS	ACRES
13	COLUMEDOM	0.05
	COMMERCIAL	0.65
	PAVING/HARDSCAPE	
	SF - 1 ACRE	
	SF - 1/2 ACRE	
	SF - 1/4 ACRE	
	MF - CONDOMINIUMS	
	MF - APARTMENTS	
	MOBILE HOME PARK	
	LANDSCAPING	
	RETENTION BASIN	
	GOLF COURSE	
	MOUNTAINOUS	000/
	LOW LOSS RATE (PERCENT)	90%
27	LENGTH OF MATERIOGUES (L)	900
	LENGTH OF WATERCOURSE (L)	330
	LENGTH TO POINT OPPOSITE CENTROID (Lca)	120
30	ELEVATION OF HEADWATER	48.8
	ELEVATION OF HEADWATER ELEVATION OF CONCENTRATION POINT	47.15
33	ELEVATION OF CONCENTRATION POINT	47.15
	AVERAGE MANNINGS 'N' VALUE	0.02
35	AVERAGE MANIMINGS IN VALUE	0.02
	STORM FREQUENCY (YEAR)	10
37	STORWITHEQUENCY (TEAH)	10
	POINT RAIN	
	3-HOUR	1.14
	6-HOUR	1.46
	24-HOUR	2.37
42		
	BASIN CHARACTERISTICS:	ELEVATION AREA
44		
45		
46		
47		
48		
49		Carry March Company of the Company of the Company
50	×	
51		
	PERCOLATION RATE (in/hr)	0
53	, , ,	
	DRYWELL DATA	
	NUMBER USED	
	PERCOLATION RATE (cfs)	
	The second secon	

RCFCD :	SYNTHE	TIC UNIT	HYDROG	RAPH M	ETHOD	PROJECT:	LA QUINTA	VILLAGE - 3				
BASIC DA	TA CALCU	LATION FO	ORM				C1200					
SHORTCUT	METHOD					BY	S R. BAZUA	, P.E.	DATE	7/26/2016		
					PHYSIC	AL DATA						
[1] CONCEN	TRATION PO	TAIC										
[2] AREA DE	SIGNATION							ON-	SITE			
[3] AREA - A	CRES							0.6	50			
(4) L-FEET								33	30			
[5] L-MILES								0.0	63			
[6] La-FEET								120	0.00			
[7] La-MILES)							0.0	23			
	ON OF HEAD							48	8.8			
[9] ELEVATION	ON OF CONC	ENTRATION	POINT					47.				
(10) H-FEET								1,				
[11] S-FEET/	MILE							26				
[12] \$^0.5								5.				
[13] L*LCA/S								0.0				
	SE MANNING	is 'N'						0.				
[15] LAG TIN								0.				
[16] LAG TIM								1				
	F LAG-MINUT							1				
[18] 200% O								2				
		(100%-200%				5						
[24] TOTAL F	PERCOLATIO	ON RATE (cfs)					0.	00			
					RAINFA	LL DATA						
[1] SOURCE												
[2] FREQUE		10										
[3] DURATIC	N:											
	3-HC	URS			6-HC	OURS			24-HC			
[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	
POINT	AREA		AVERAGE	POINT	AREA	ľ	AVERAGE	POINT	AREA		AVERAGE	
RAIN			POINT	FIAIN		1	POINT	RAIN			POINT	
INCHES	10	[RAIN	INCHES		ł	RAIN	INCHES			RAIN	
(Plate E-5.2)			INCHES	(Plate E-5.4)			INCHES	(Plate E-5.6)			INCHES	
1.14	0.650	1.00	1.14	1.46	0.650			2.37	0.650	1.00	2.3	
		0.00	0.00			0.00				0.00	0.0	
		0.00	0.00			0.00				0.00	0.0	
S		0.00	0.00			0.00			2.22	0.00	0.0	
SUM [5]		SUM [7]		SUM [9]	0.65	SUM [11]		SUM [13]	0.65	SUM [15]	2.3	
[16] AREA A		.,	1.000				1.000	l			1.000	
T/LADJ AVC	3 POINT RAII	V	1.14				1.46				2.3	

STO	RM EVE	NT SUMM	ARY	
DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.72	0.69	0.70
FLOOD VOLUME	(cu-ft) (acre-ft)	1,708 0.04	1,636 0.04	1,653 0.04
REQUIRED STORAGE	(cu-ft) (acre-ft)	1,694 0.04	1,623 0.04	1,639 0.04
PEAK FLOW	(cfs)	0.64	0.55	0.13
MAXIMUM WSEL	(ft)		*	

10 YR EVENT - 1 HOUR VOLUME

Using the RCFC&WCD Short Cut Unit Hydrograph Method Area Designations La Quinta Village - 4

90
0.07 (used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per plate E-1.1 (3 of 6))
90
0 60 24 2.37 1 3 0.78 1.14 A 32 0.375 (AMC II) Percentage of Impervious Cover (A)(%) (plate E-6.3) Weighted Average Loss Rate (F=Fp(1-.94l))(in./hr.) Low Loss Rate Percent (%) Retention Basin Percolation Rate (in/hr) 10 Year Storm Duration (hrs)
Total Precipitation (From Plates E-5.2, 5.4, 5.6)(in.)
Soils Group Plate E-6.2 Pervious Area Loss Rate (Fp)(in/hr) AMC index II Runoff Number (plate E-6.1) Drainage Area (ac.) Unit time (minutes)

Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used Percolation is taken incrementally.

0.00 Upper max.(cf)= 0.00 (d/3)*(bottom+top+(bottom*top)^0.50) (values must be non-zero or error occurs) Drywell tower max. (cf)=
Drywell total(cf)=
73570,23 (Drywell can be "zeroed out" by reducing numbers to 0.001 or less, but should not be entered with 0 or program chokes.)

Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*Pl()*(diam/2)*2*(lower)*Pl()*(diam/2)*2+0.4*((diam/2+1.3333)*2-(diam/2+0.3333)*2-(diam/2)*2-0.001

Lower max. (of gin factors

Upper sec. (R.)=

0.001

Drywell lower max. (of Max. storage= Max. Depth (d)= h=(vol*3)/(bottom+top+(bottom*top)^0.5) 10000 s.f. area=bottom+(h/d)*(top-bottom) Bot = 20000 s.f. vol=(h/3)*(bottom+top+(bottom*top)^0.50) = do1 Outside input from: Ret. Basin design (area, depth) Formulas vol=(h/3)*(botton Drywell design factors

0.00

	_	· ·	0	(((_	_	_		0	0)	0	0	0	0	0	0	0
	Overflow	Rate (cfs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	_	0.00	0.00	_	0.00	00:00	0.00	0.00	0.00	0.0
	Overflow	Vol. (cf)	00'0	00'0	0.00	00.00	00'0	0.00	00'0	00'0	00'0	0.00	0.00	0.00	00:0	00.00	00'0	0.00	0.00	00'0	0.00	0.00
Ë	a	Depth (ff) Vo	0.02	0.05	0.10	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0,16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Basin	Sto	Dep	295.52	726.83	442.79	72.89	72.89	72.89	72.89	72.89	2372.89	72.89	72,89	72.89	72.89	72.89	72.89	72.89	72.89	72.89	72.89	72,89
Basin	Storage	Vol. (cf)	55	7.	14	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23.
Basin	Period	Perc. (cf)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	00.0	0.00	0.00	0.00	0.00	00.00	0.00	0.00	0.00	0.00
	tetention F	Area (st) F	10000 00	10040.17	10098.79	10196.11	10322.53	10322.53	10322.53	10322.53	10322.53	10322.53	10322.53	10322.53	10322.53	10322.53	10322.53	10322,53	10322.53	10322.53	10322.53	10322,53
Overflow	LF.		295.52	431,31	715.96	930,10	00'0	00'0	00'0	0.00	0.00	0.00	00.0	0.00	0.00	0.00	00.00	00.00	00.00	00:0	00.0	00.00
Drywell Ov	Storage To	Depth (ft) Ba	00.00	00.00	00.00	0.00	0.00	0.00	0.00	0.00	00.00	0.00	00.00	0.00	0.00	0.00	0.00	0.00	000	0.00	0.00	000
			0.00	0.00	0.00	0.00	0.00	0.00	0.00	00.00	00.00	0.00	00.00	00.00	0.00	00.0	00.0	0.00	00.00	00.00	00.00	0.00
Drywell Dr.		Perc. (cf) Vo	_	0.00	0.00	0.00	0.00	0.00	0.00	00.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	00.00
_	Retention Per	Area (st) Per	0	000	00.00	00.0	0.00	0.00	0.00	0.00	0.00	0.00	00.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	00.00
Drywell	Rete	Area	00'0	00.0	0.00	00.0	0.00	00.00	0.00	00.0	00.00	00.00	0.00	00.0	00.0	0.00	0.00	00.0	00.0	00.0	00.0	00.0
	Outside	Input (cf)																	_			_
	-low	Vol. (cf)	295.52	431,31	715.96	930,10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	00'0	00.0	0.00
	Flow	(cfs)	0.3284	0,4792	0.7955	1.0334	0.0000	00000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	00000
	Effective	Rain (in/hr) I	0,3531	0.5153	0.8554	1.1112	0.0000	0.000	0.0000	0.000	0.000	0,000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0 0000	0.0000
							000	0.00	0.00	0.00	00'0	00'0	00'0	0.00	00'0	0.00	0.00	0.00	0.00	0.00	00'0	0.00
ents	Loss Rate Value	Max. Min.	0.0713 N/A	0.0713 N/A	0.0713 N/A	0.0713 N/A	0,0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713	0.0713
1 Hour Storm in 15 minute increments	Storm		0.4243	0.5866	0 9266	1,1825	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
in 15 min	Pattern		13.6	18.8	29.7	37.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ir Storm			0:15	0:30	0:45	1:00				2				က				4				S
1 Hou	Time																					

A	B C D
1 RCFCD SYNTHETIC UNIT HYDROGRAI	
2 DATA INPUT SHEET	
3	
4 WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.
5	
6 PROJECT NAME	LA QUINTA VILLAGE - 4
7	C1200
8	
9 CONCENTRATION POINT DESIGNATION	1
10 AREA DESIGNATION	ON-SITE
11	40050
12 TRIBUTARY AREAS	ACRES
13	0.00
14 COMMERCIAL	0.93
15 PAVING/HARDSCAPE	
16 SF - 1 ACRE	Continue to the Continue of
17 SF - 1/2 ACRE	
18 SF - 1/4 ACRE	A CONTRACTOR OF THE PARTY OF TH
19 MF - CONDOMINIUMS	
20 MF - APARTMENTS 21 MOBILE HOME PARK	
22 LANDSCAPING	
23 RETENTION BASIN	
24 GOLF COURSE	
25 MOUNTAINOUS	
26 LOW LOSS RATE (PERCENT)	90%
27 LOW LOSS HATE (PERCENT)	90 70
28 LENGTH OF WATERCOURSE (L)	430
29 LENGTH TO POINT OPPOSITE CENTROID (Lca)	140
30	U-32
31 ELEVATION OF HEADWATER	52.9
32 ELEVATION OF CONCENTRATION POINT	50.75
33	
34 AVERAGE MANNINGS 'N' VALUE	0.02
35	
36 STORM FREQUENCY (YEAR)	10
37	
38 POINT RAIN	
39 3-HOUR	1.14
40 6-HOUR	1.46
41 24-HOUR	2.37
42	
43 BASIN CHARACTERISTICS:	ELEVATION AREA
44	
45	
46	
47	
48	
49	
50	
51	
52 PERCOLATION RATE (in/hr)	0
53	
54 DRYWELL DATA	
55 NUMBER USED	
56 PERCOLATION RATE (cfs)	

	SYNTHET TA CALCU			RAPH M	ETHOD	PROJECT:	LA QUINTA C1200	VILLAGE - 4			
SHORTCUT						BY	ES R. BAZUA	N, P.E.	DATE	7/26/2016	
					PHYSIC	AL DATA					
[1] CONCEN	TRATION PO	DINT							1		
[2] AREA DE	SIGNATION							ON-	SITE		
[3] AREA - A	CRES							0.9	930		
(4) L-FEET									30		
[5] L-MILES								0.0			
6] La-FEET									0.00		
7] La-MILES								0.0			
	ON OF HEAD								2.9		
	ON OF CONC	CENTRATION	POINT						.75		
[10] H-FEET									15		
[11] S-FEET/	MILE								5.4		
[12] \$40.5									14		
[13] L'LCA/S		0.10							000		
14] AVEHAC	SE MANNING	IS 'N'						0.			
	IE-MUUHS					-		0.			
	LAG-MINUTES	TEC							.5 .5		
	LAG-MINUT								.0		
	ME-MINUTES		OFLAGI						. o 5		
	PERCOLATIO							0.0			
21/10///2	CHOOLITIC	214 THE 1010			DAINEA	LL DATA			-		
11 SOURCE					HAIRI A	LL DAIA					
	NCY-YEARS	10									
31 DURATIO		10									
0100101110	3-HC	URS		r	6-HC	OURS		r	24-H0	OURS	
[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
POINT	ARÉA		AVERAGE	POINT	AREA	'-'	AVERAGE	POINT	AREA		AVERAG
RAIN			POINT	RAIN			POINT	RAIN	1		POINT
INCHES			RAIN	INCHES		1	RAIN	INCHES			RAIN
Plate E-5.2)			INCHES	(Plate E-5.4)			INCHES	(Plate E-5.6)			INCHES
1.14	0.930	1.00	1.14	1.46	0.930	1.00			0.930		2,
		0.00	0.00			0.00				0.00	0.
		0.00				0.00				0.00	0.
		0.00	0.00			0.00				0.00	0.
SUM [5]		SUM [7]		SUM [9]	0.93	SUM [11]		SUM [13]	0.93	SUM [15]	2.
16] AREA AI			1.000				1.000				1.0
17] ADJ AVC	POINT RAI	N .	1,14				1.46	1			2.

STO	RM EVE	NT SUMM	ARY	
DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.72	0.69	0.70
FLOOD VOLUME	(cu-ft) (acre-ft)	2,443 0.06	2,341 0.05	2,364 0.05
REQUIRED STORAGE	(cu-ft) (acre-ft)	2,423 0.06	2,322 0.05	2,345 0.05
PEAK FLOW	(cfs)	0.91	0.78	0.19
MAXIMUM WSEL	(ft)			(46

HYDROLOGY CALCULATIONS - s Sample

10 YR EVENT - I HOUR VOLUME

Using the RCFC&WCD Short Cut Unit Hydrograph Method Area Designations La Quinta Village - 5

0.79	15 15 60	1 3 6 24	, 5.6)(in.) 0.78 1.14 1.46 2.37	•	32	(in/hr) 0.375 (AMC II)	plate E-6.3) 90	(i),(in./hr.) 0 07 (used for 1, 3, and 6 hour storm, the 24 hour storm uses variable maximum loss rate per pla	06	0	4 th
Drainage Area (ac.)	Unit time (minutes)	10 Year Storm Duration (hrs)	Total Precipitation (From Plates E-5.2, 5.4, 5.6)(in.)	Soils Group	AMC index II Runoff Number (plate E-6.1)	Plate E-6 2 Pervious Area Loss Rate (Fp)(in/hr)	Percentage of Impervious Cover (Ai)(%) (plate E-6 3)	Weighted Average Loss Rate (F=Fp(19Ai))(in./hr.)	Low Loss Rate Percent (%)	Retention Basin Percolation Rate (in/hr)	Change design in Antonia in the land

olate E-1.1 (3 of 6))

73570.23 (d/3)*(bottom+top+(bottom*top)^0 50) (values must be non-zero or error occurs) Drywell lower max. (cf)= Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*PI()*(diami2)*2+(lower)*PI()*(diami2)*2+0.4*(idiami2)*2*2*(idiami2)*2*(idiami2)*2*(idiami2)*2*(idiami2)*2*(idiami2)*2*(idiami2)*2*(idiami2)*2*(idiami2)*2*(idiami2)*2*(idiami2)*2*(idiami2)*2*(idiami2)*2*(idiami2)*2*(idiami2)* Drywell total(cf)= Max. storage= Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used h=(vol*3)/(bottom+top+(bottom*top)^0.5) Ring diam. (ft.) = (Drywell can be "zeroed out" by reducing numbers to 0.001 or less, but should not be entered with 0 or program chokes.) Max. Depth (d)= 10000 s.f. area=bottom+(h/d)*(top-bottom) Bot = 20000 s.f. $\mathsf{vol}{=}(h/3)^*(\mathsf{bottom}{+}\mathsf{top}{+}(\mathsf{bottom}^*\mathsf{top})^{\mathsf{A}}0.50)$ Upper sec. (ft.)= Top= Ret. Basin design (area, depth) Formulas vol=(h/3)*(botton Drywell design factors

Outside input from:

0.00

0.00 Upper max.(cf)= 0.00

Rate (cfs) Overflow Storage Overflow Depth (ff) Vol. (cf) 0.14 1225.60 251.03 2015.68 2015.68 2015.68 2015.68 2015.68 2015.68 2015.68 2015.68 2015.68 2015.68 2015.68 2015,68 2015.68 2015.68 Period Storage
Period Basin 10000,00 10083.92 Retention Basin (cf) Area (sf) 366.39 608.18 790.08 251.03 0.00 Overflow 0.00 Area (sf) Petr. (sf) Vol. (cf) Depth (ff) Col. (cf) Storage Storage Drywell Drywell Drywell Retention Period Input (ct) Outside 251.03 366.39 608.18 790.08 Rain (in/hr) Rate (cfs) Vol. (cf) 0.4071 0.6758 0.8779 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 000000 0.0000 0.0000 0,0000 0.0000 0.5153 0.0000 0.000,0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 00000 0.0000 00000 0.0000 0.0000 0.8554 Loss Rate Value 0.0713 N/A 0.0713 N/A 0.0713 N/A Min 0.0713 N/A 0,0713 0.0713 0 0713 0.0713 0.0713 0.0713 0.0713 0.0713 0.0713 0.0713 0,0713 0.0713 0.0713 0.0713 0.0713 Rain (in/hr) Max. 1 Hour Storm in 15 minute increments 0.5866 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 1.1825 0.0000 18.8 29.7 37.9 000000000000000 0:15 0:30 1:00

	A	Т в Т	С		D
1	RCFCD SYNTHETIC UNIT HYDROGRAPH				
-	DATA INPUT SHEET				
	DATA INPUT SHEET				
3	WORKSHEET PREPARED BY:	TAMES D. DAZUA D.E.			
	WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.			
5	DDO IFOT MANE	LA OLINITA VIII LAGE E			
	PROJECT NAME	LA QUINTA VILLAGE - 5			
7 8		C1200			
	CONCENTRATION POINT DECICNATION	T		_	
	CONCENTRATION POINT DESIGNATION AREA DESIGNATION	ON OUT		_	_
_	AREA DESIGNATION	ON-SITE			
11	TRIBUTARY AREAS	ACDEC			
13	INIBUTANT AREAS	ACRES			
	COMMERCIAL	0.79			1.20
	PAVING/HARDSCAPE	0.78			
	SF - 1 ACRE				
	SF - 1/2 ACRE				
	SF - 1/4 ACRE				
	MF - CONDOMINIUMS				
	MF - APARTMENTS				
	MOBILE HOME PARK				
	LANDSCAPING				
	RETENTION BASIN				
	GOLF COURSE				
	MOUNTAINOUS				
	LOW LOSS RATE (PERCENT)	90%			
27	EOW EOOS WITE (I ENOEWY)	0070			
	LENGTH OF WATERCOURSE (L)	360			
	LENGTH TO POINT OPPOSITE CENTROID (Lca)	125			
30					
	ELEVATION OF HEADWATER	48.7			
32 E	ELEVATION OF CONCENTRATION POINT	46.9			
33					
34	AVERAGE MANNINGS 'N' VALUE	0.02			
35					
	STORM FREQUENCY (YEAR)	10			
37					
	POINT RAIN				
	3-HOUR	1.14			_
	3-HOUR	1.46			
	24-HOUR	2.37			
42					
	BASIN CHARACTERISTICS:	ELEVATION	AREA		
44					
45					
46					
47					1
48					
49 50					
51					
	DEPCOLATION BATE (in/hr)	0			
53	PERCOLATION RATE (in/hr)	U			
	DRYWELL DATA				
	NUMBER USED				
	PERCOLATION RATE (cfs)				
1 00 lb	LUOOFVIION DATE (019)		_		

RCFCD S	SYNTHET	IC UNIT	HYDROG	RAPH ME	ETHOD	PROJECT:	LA QUINTA	VILLAGE - 5			
BASIC DA	TA CALCU	LATION FO	DRM				C1200				
SHORTCUT		2, (11014)	3. (14)			BY	ES R. BAZUA	V. P.E.	DATE	7/26/2016	
					PHYSIC	AL DATA					
[1] CONCEN	TRATION PO	INT									
2 AREA DE	SIGNATION							ON-S	SITE		
3] AREA - A	CRES							0.7	90		
[4] L-FEET								36	50		
[5] L-MILES								0.0			
[6] La-FEET								125	5.00		
7] La-MILES								0.0			
B] ELEVATION								48			
(9) ELEVATION	ON OF CONC	ENTRATION	POINT					46			
[10] H-FEET								1,			
[11] S-FEET/	MILE							26			
[12] \$^0.5								5.			
[13] L*LCA/S								0.0			
[14] AVERAG		S 'N'						0.0			
[15] LAG TIM								0.0			
[16] LAG TIM								1,			
[17] 100% OF								1,			
[18] 200% OF								2.			
[19] UNIT TIN									5		
[24] TOTAL P	EHCOLATIC	N HATE (cis)		DAINEA			0.0	00		
M COLIDAR					KAINFA	LL DATA					
[1] SOURCE [2] FREQUEN	ICY-YEARS	10									
[3] DURATIO		10									
	3-HO	URS			6-HC	OURS			24-HC	DURS	
[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
POINT	AREA		AVERAGE	POINT	AREA		AVERAGE	POINT	AREA		AVERAG
RAIN			POINT	RAIN			POINT	RAIN			POINT
INCHES			RAIN	INCHES			RAIN	INCHES			PAIN
(Plate E-5.2)		U (INCHES	(Plate E-5.4)			INCHES	(Plate E-5.6)			INCHES
1.14	0.790	1.00	1.14	1.46	0.790			2.37	0.790	1.00	2.3
		0.00	0.00			0.00				0.00	0.1
		0.00	0.00			0.00				0.00	0.0
		0.00	0.00			0.00			- 4	0.00	0.
SUM [5]		SUM [7]		SUM [9]	0.79	SUM [11]		SUM [13]	0.79	SUM [15]	2.
16] AREA AL			1.000				1.000				1.00
17] ADJ AVG	POINT HAI	V	1.14				1.46				2.

STO	RM EVE	NT SUMM	ARY	
DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.72	0.69	0.70
FLOOD VOLUME	(cu-ft) (acre-ft)	2,076 0.05	1,989 0.05	2,00 9 0.05
REQUIRED STORAGE	(cu-ft) (acre-ft)	2,058 0.05	1,972 0.05	1,992 0.05
PEAK FLOW	(cfs)	0.78	0.66	0.16
MAXIMUM WSEL	(ft)			- 3

10 YR EVENT - I HOUR VOLUME HYDROLOGY CALCULATIONS - s Sample

Using the RCFC&WCD Short Cut Unit Hydrograph Method Area Designations La Quinta Village - 6

8 AMC index II Runoff Number (plate E-6.1)
Plate E-6.2 Pervious Area Loss Rate (Fp)(in/hr)
Percentage of Impervious Cover (Ai)(%) (plate E-6.3) Total Precipitation (From Plates E-5.2, 5.4, 5.6)(in.) Weighted Average Loss Rate (F=Fp(1-.9Ai))(in./hr.) Retention Basin Percolation Rate (in/hr) 10 Year Storm Duration (hrs) Low Loss Rate Percent (%) Drainage Area (ac.) Unit time (minutes) Soils Group

Basin volume is calculated using the "truncated pyramid" formula, a more conservative estimate than "averaged end areas" sometimes used Percolation is taken incrementally.

73570.23 (d/3)*(bottom+top+(bottom*top)^0.50) (values must be non-zero or error occurs) Drywell lower max. (cf)= (Drywell can be "zeroed out" by reducing numbers to 0.001 or less, but should not be entered with 0 or program chokes.)

Drywell storage includes 40% of the 1' wide rock bed surrounding the drywell: formula (upper)*Pl()*(diam/2)*2*(lower)*Pl()*(diam/2)*2*0.4*((diam/2*1.3333)*2-(diam/2*4.3333)*2-(dia Drywell total(cf)= Max. storage= Max. Depth (d)= h=(vol*3)/(bottom+top+(bottom*top)^0.5) 10000 s.f. area=bottom+(h/d)*(top-bottom) Bot = 20000 s.f. ign (area, depth) Top =
vol=(h/3)*(bottom+top+(bottom*top)^0.50) Outside input from: Ret Basin design (area, depth)
Formulas vol=(h/3)*(botton Drywell design factors

0.00

0.00 Upper max.(cf)=

Rain	Loss Rati Max. 0.0713 0.0713 0.0713 0.0713 0.0713	e Value Min.	Effective	Flow													
% Rain (inf) 13.6 0.42. 14.8 0.42. 29.7 0.40. 0.00. 0.	0.0713 0.0713 0.0713 0.0713 0.0713 0.0713	Min.			Flow Outs	Outside	Retention	Period	Storage 5	Storage	0	Retention	Period	Storage	Storage	Overflow	Overflow
	0.0713 0.0713 0.0713 0.0713 0.0713 0.0713		Rain (in/hr)	Rate (cfs)	Vol. (cf) Inpul	nput (cf)	Area (sf)	Perc. (cf)	_	Depth (ft)	Basin (cf) /	Area (sf)	Perc, (crl)	Vol. (cf)	Depth (ft)	Vol. (cf)	Rate (cfs.
	0.0713 0.0713 0.0713 0.0713 0.0713	N/A	0.3531	0.2048	184.30	0.00	00.00	0.00	00.00	0.00	184.30	10000.00	00'0	184.30	0.01	0.00	0.0
	0.0713 0.0713 0.0713 0.0713	N/A	0.5153	3 0.2989	268.99	00'0	00.00	0.00	0.00	0.00	268.99	10025,05	0.00	453.29	9 0.03	0.0	0.0
	0000	N/A	0.8554		446.51	00'0	0.00	00.0	0.00	0.00	446.51	10061,61	00.00	899.81	90.0	0.00	0.00
		N/A	1.1112		580.06	0.00	00.00	00.0	0.00	0.00	580,06	10122,31	0.00	1479.87	7 0.10	0.00	0.00
5000 5000 5000 5000 5000 5000 6000 6000		0.00	000000 0	00000'0 0	0.00	0.00	00'0	0.00	0.00	0.00	00.00	10201.15	00'0	1479.87	7 0.10	0.00	0.0
5000 5000 5000 5000 5000 5000 6000 6000		0.00	_	000000 0	00'0	0.00	00.0	00.00	00'0	0.00	0.00	10201.15	00'0	1479.87	7 0.10	0.00	0.0
00000		000	_		00.00	0.00	0.00	00.00	0.00	0.00	00.00	10201.15	0.00	1479.87		0.00	0.00
000000000000000000000000000000000000000		0.00	_		00.00	0.00	00.00	00.00	0.00	0.00	00"0	10201.15	0.00	1479.8		0.00	
0000		0.00	00000 0	000000 0	00:00	0.00	0.00	00.00	0.00	0.00	0.00	10201.15	0.00	1479.8	7 0.10	0.00	00.00
00.0 00.0 0		0.00			00.0	0.00	0.00	00.00	0.00	0.00	000	10201,15		1479.8		0.00	_
00.0		0.00			00.00	0.00	0.00	00.00	00'0	0.00	00.00	10201,15	0.00	1479.8		0.00	0.00
00.00		00.00			00:0	0.00	0.00	0.00	0.00	00.00	00.00	10201,15		1479.8		0.00	
0 0.00		0.00			00:00	0.00	0.00	0.00	0.00	0.00	00.00	10201.15	0.00	1479.8		0.00	0.00
		0.00			00:0	0.00	0.00	0.00	0.00	0.00	00.0	10201.15		1479.8		0.00	
0 0.0%	0.0000 0.0713	00.00		000000	00.00	0.00	0.00	0.00	0.00	00.00	000	10201.15	0.00	1479.8		0.00	
0 0.0000	_	0.00			00"0	0.00	0.00	0.00	0.00	0.00	00'0	10201.15	00.00	1479.8		0.00	
0 0.0000	_	0.00		_	0.00	0.00	00'0	0.00	0.00	00'0	00'0	10201.15	0.00	1479.8	7 0.10	0.00	0.00
0 0,000	_	0.00	000000 0	0000000	0.00	0.00	0.00	0.00	0.00	00.00	0.00	10201.15	0.00	1479.87	7 0.10	0.00	0
0 0,000	000 0.0713	0.00	000000 0	0000000	0.00	0.00	0.00	00.00	0.00	0.00	0.00	10201.15	0.00	1479.8	7 0.10	0.00	-0
0 0,000	000 0,0713	00'0	000000 0	000000 0	00:00	0.00	0.00	00.00	0.00	0.00	00.00	10201.15	0.00	1479.87	7 0.10	0.00	0.0

A	B C D
1 RCFCD SYNTHETIC UNIT HYDROGRA	
3	TAMES OF SATURA D. F.
WORKSHEET PREPARED BY:	JAMES R. BAZUA, P.E.
5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	TA OFFICE OF THE PARTY OF THE P
6 PROJECT NAME	LA QUINTA VILLAGE - 6
7	C1200
8 CONSENTE ATION POINT REGIONATION	
9 CONCENTRATION POINT DESIGNATION	1
AREA DESIGNATION	ON-SITE CONTRACTOR OF THE PROPERTY OF THE PROP
11	
12 TRIBUTARY AREAS	ACRES
13	
4 COMMERCIAL	0.58
15 PAVING/HARDSCAPE	
6 SF - 1 ACRE	
17 SF - 1/2 ACRE	
18 SF - 1/4 ACRE	fine personal and
9 MF - CONDOMINIUMS	
MF - APARTMENTS	
MOBILE HOME PARK	
22 LANDSCAPING	
RETENTION BASIN	
24 GOLF COURSE	
MOUNTAINOUS	
26 LOW LOSS RATE (PERCENT)	90%
27	
28 LENGTH OF WATERCOURSE (L)	300
9 LENGTH TO POINT OPPOSITE CENTROID (Lca)	80
30	
31 ELEVATION OF HEADWATER	44.9
2 ELEVATION OF CONCENTRATION POINT	43.4
33	
34 AVERAGE MANNINGS 'N' VALUE	0.02
35	
STORM FREQUENCY (YEAR)	10
37	
B POINT RAIN	
9 3-HOUR	1.14
0 6-HOUR	1.46
1 24-HOUR	2.37
2	
3 BASIN CHARACTERISTICS:	ELEVATION AREA
4	
5	Participation of the Control of the
6	The second secon
5 7	A SHARLING THE SHA
3	
9	
0	
1	
2 PERCOLATION RATE (in/hr)	0
3	0
4 DRYWELL DATA	
NUMBER USED	
6 PERCOLATION RATE (cfs)	
O JELNOOLATION NATE (GIS)	

RCFCD	SYNTHE	TIC UNIT	HYDRO	BRAPH MI	ETHOD	PROJECT:	LA QUINTA	VILLAGE - 6			
BASIC DA	TA CALCU	JLATION F	ORM				C1200				
SHORTCUT						BY	ES R. BAZUA	λ, P.E.	DATE	7/26/2016	
					PHYSIC	AL DATA					
[1] CONCEN	TRATION P	TNIC				T			1		
[2] AREA DE	SIGNATION							ON-	SITE		
[3] AREA - A	CRES							0.8	580		
(4) L-FEET								31	00		
[5] L-MILES								0.0	057		
6] La-FEET								80	.00		
7] La-MILES								0.0	015		
8] ELEVATION	ON OF HEAD	DWATER						44	1.9		
9] ELEVATION	ON OF CON	CENTRATION	POINT					43	3.4		
10] H-FEET								1	.5		
11 S-FEET/	MILE							26	5.4		
12] S^0.5								5.	14		
[13] L*LCA/S	^0.5							0.0	000		
14] AVERAC	SE MANNING	3S 'N'						0.	02		
15] LAG TIN	E-HOURS							0.	02		
16) LAG TIN	E-MINUTES							1	.1		
17] 100% OI	F LAG-MINU	TES						1	.1		
18] 200% OI	F LAG-MINU	TES						2	.1		
19] UNIT TIN	ME-MINUTES	6 (100%-200%	6 OF LAG)						5		
24 TOTAL F	PERCOLATION	ON RATE (cls)					0.	00		-
			-		RAINFA	LL DATA					
11 SOURCE	4										
2) FREQUE	NCY-YEARS	10									
3 DURATIO											
	3-H0	DURS		i	6-HC	DURS			24-HC	URS	
[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
POINT	AREA		AVERAGE	POINT	ARÉA		AVERAGE	POINT	AREA		AVERAG
RAIN		9	POINT	RAIN			POINT	RAIN	1 1		POINT
INCHES			RAIN	INCHES			RAIN	INCHES			RAIN
Plate E-5.2)			INCHES	(Plate E-5.4)			INCHES	(Plate E-5.6)			INCHES
1.14	0.580		1.14	1.46	0.580		1.46		0.580	1.00	2.3
		0.00	0.00			0.00				0.00	0.0
		0.00	0.00			0.00				0.00	0.0
		0.00	0.00			0.00	0.00			0.00	0.0
SUM [5]		SUM [7]	1.14	SUM [9]	0.58	SUM [11]	1.46	SUM [13]	0.58	SUM [15]	2.3
16] AREA A			1.000	l			1.000				1.00
17] ADJ AVG	POINT RAI	N	1.14	l			1.46	1			2.3

STORM EVENT SUMMARY				
DURATION		3-HOU P	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	0.72	0.69	0.70
FLOOD VOLUME	(cu-ft) (acre-ft)	1,524 0.03	1,460 0.03	1,475 0.03
REQUIRED STORAGE	(cu-ft) (acre-ft)	1,511 0.03	1,448 0.03	1,462 0.03
PEAK FLOW	(cfs)	0.57	0.49	0.12
MAXIMUM WSEL	(ft)	•	*	91

V. STREET CAPACITY ANALYSIS

Vacant parcels designated for commercial development within La Quinta Village were identified and studied to determine the runoff discharge tributary to each vacant parcel under the existing-vacant condition as well as the projected commercially developed condition. The results were compared for all vacant commercial parcels in order to determine the increase in runoff due to 100% buildout within La Quinta Village (see APPENDIX "10 YEAR DISCHARGE STUDY MAP")

The total additional runoff generated by commercial development of existing vacant lots within La Quinta Village during the 10 year rain event is 9.89 cfs occurring along Calle Tampico where flows combine creating the worst case condition.

Based on the Psomas Downtown Area Drainage Report, the downtown area is subject to flooding under the existing condition in the northern reaches of Avenida Bermudas, Desert Club Drive and all along Calle Tampico. Existing catch basins along Calle Tampico and the underground storm drain pipe network do not have the capacity to convey the 10-year peak storm runoff from the downtown area and adjacent neighborhood. Existing studies calculate runoff tributary to Calle Tampico during the 10 year peak storm event by combining 71 cfs from the area west of Avenida Bermudas with 41.5 cfs generated between Avenida Bermudas and Desert Club Drive for a total of 112.5 cfs under the existing condition. Development of the existing vacant parcels within the study area for commercial use increases the discharge along Calle Tampico by 8.8%.

RIVERSIDE COUNTY RATIONAL METHOD WORSHEETS

Riverside County Rational Hydrology Program

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File: UNDEVELOPED1.out
    ______
    SUBAREA 1 - UNDEVELOPED CONDITION
    10 YEAR RAIN EVENT
    ______
     ******* Hydrology Study Control Information ********
     English (in-lb) Units used in input data file
     ______
    Program License Serial Number 6253
    Rational Method Hydrology Program based on
    Riverside County Flood Control & Water Conservation District
    1978 hydrology manual
    Storm event (year) = 10.00 Antecedent Moisture Condition = 1
    2 year, 1 hour precipitation = 0.380(In.)
    100 year, 1 hour precipitation = 1.690(In.)
    Storm event year = 10.0
    Calculated rainfall intensity data:
    1 hour intensity = 0.919(In/Hr)
    Slope of intensity duration curve = 0.5900
    ++++
    Process from Point/Station 100.000 to Point/Station
101.000
    **** INITIAL AREA EVALUATION ****
    Initial area flow distance = 410.000(Ft.)
    Top (of initial area) elevation = 51.400(Ft.)
    Bottom (of initial area) elevation = 49.300(Ft.)
    Difference in elevation = 2.100(Ft.)
    Slope = 0.00512 \text{ s(percent)} = 0.51
    TC = k(0.530)*[(length^3)/(elevation change)]^0.2
    Initial area time of concentration = 16.885 min.
    Rainfall intensity = 1.942(In/Hr) for a 10.0 year storm
```

UNDEVELOPED (poor cover) subarea Runoff Coefficient = 0.707 Decimal fraction soil group A = 0.000 Decimal fraction soil group B = 0.000 Decimal fraction soil group C = 1.000 Decimal fraction soil group D = 0.000 RI index for soil(AMC 1) = 71.60 Pervious area fraction = 1.000; Impervious fraction = 0.000 Initial subarea runoff = 0.494 (CFS) Total initial stream area = 0.360 (Ac.) Pervious area fraction = 1.000 End of computations, total study area = 0.36 (Ac.) The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File: UNDEVELOPED2.out
    SUBAREA 2 - UNDEVELOPED CONDITION
    10 YEAR RAIN EVENT
     ______
     ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
_____
    Program License Serial Number 6253
     ______
    Rational Method Hydrology Program based on
    Riverside County Flood Control & Water Conservation District
    1978 hydrology manual
    Storm event (year) = 10.00 Antecedent Moisture Condition = 1
    2 year, 1 hour precipitation = 0.380(In.)
    100 year, 1 hour precipitation = 1.690(In.)
    Storm event year = 10.0
Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
    Slope of intensity duration curve = 0.5900
     ++++
    Process from Point/Station 200.000 to Point/Station
202.000
     **** INITIAL AREA EVALUATION ****
    Initial area flow distance = 275.000(Ft.)
    Top (of initial area) elevation = 51.400(Ft.)
    Bottom (of initial area) elevation = 50.000(Ft.)
    Difference in elevation = 1.400(Ft.)
    Slope = 0.00509 \text{ s(percent)} = 0.51
    TC = k(0.530)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 14.410 min.
    Rainfall intensity = 2.132(In/Hr) for a 10.0 year storm
```

UNDEVELOPED (poor cover) subarea Runoff Coefficient = 0.721 Decimal fraction soil group A = 0.000 Decimal fraction soil group B = 0.000 Decimal fraction soil group C = 1.000 Decimal fraction soil group D = 0.000 RI index for soil(AMC 1) = 71.60 Pervious area fraction = 1.000; Impervious fraction = 0.000 Initial subarea runoff = 1.199(CFS) Total initial stream area = 0.780(Ac.) Pervious area fraction = 1.000 End of computations, total study area = 0.78 (Ac.) The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File:UNDEVELOPED3.out
    SUBAREA 3 - UNDEVELOPED CONDITION
    10 YEAR RAIN EVENT
     ______
     ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
     Program License Serial Number 6253
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
     Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
                              300.000 to Point/Station
     Process from Point/Station
303.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 335.000(Ft.)
     Top (of initial area) elevation = 49.600(Ft.)
     Bottom (of initial area) elevation = 47.900(Ft.)
     Difference in elevation = 1.700(Ft.)
     Slope = 0.00507 \text{ s(percent)} = 0.51
     TC = k(0.530)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 15.603 min.
```

Rainfall intensity = 2.034(In/Hr) for a 10.0 year storm

UNDEVELOPED (poor cover) subarea Runoff Coefficient = 0.714Decimal fraction soil group A = 0.000Decimal fraction soil group B = 0.000Decimal fraction soil group C = 1.000Decimal fraction soil group D = 0.000RI index for soil(AMC 1) = 71.60Pervious area fraction = 1.000; Impervious fraction = 0.000Initial subarea runoff = 0.944(CFS)
Total initial stream area = 0.650(Ac.)
Pervious area fraction = 1.000End of computations, total study area = 0.65 (Ac.)
The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File:UNDEVELOPED4.out
    SUBAREA 4 - UNDEVELOPED CONDITION
    10 YEAR EVENT
     ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
     Program License Serial Number 6253
     _____
    Rational Method Hydrology Program based on
    Riverside County Flood Control & Water Conservation District
    1978 hydrology manual
    Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
     Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
     Process from Point/Station
                              400.000 to Point/Station
404.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 450.000(Ft.)
     Top (of initial area) elevation = 55.400(Ft.)
     Bottom (of initial area) elevation = 53.100(Ft.)
     Difference in elevation = 2.300(Ft.)
     Slope = 0.00511 \text{ s(percent)} = 0.51
     TC = k(0.530)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 17.533 min.
     Rainfall intensity = 1.899(In/Hr) for a 10.0 year storm
```

UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.704
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 71.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 2.313(CFS)
Total initial stream area = 1.730(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 1.73 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File:UNDEVELOPED5.out
     SUBAREA 5 - UNDEVELOPED CONDITION
     10 YEAR RAIN EVENT
     ******* Hydrology Study Control Information ********
     English (in-lb) Units used in input data file
-----
     Program License Serial Number 6253
     ______
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
     Process from Point/Station 500.000 to Point/Station
505.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 240.000(Ft.)
     Top (of initial area) elevation = 51.500(Ft.)
     Bottom (of initial area) elevation = 50.300(Ft.)
     Difference in elevation = 1.200(Ft.)
     Slope = 0.00500 \text{ s(percent)} = 0.50
     TC = k(0.530)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 13.695 min.
     Rainfall intensity = 2.197(In/Hr) for a 10.0 year storm
```

UNDEVELOPED (poor cover) subarea Runoff Coefficient = 0.725 Decimal fraction soil group A = 0.000 Decimal fraction soil group B = 0.000 Decimal fraction soil group C = 1.000 Decimal fraction soil group D = 0.000 RI index for soil (AMC 1) = 71.60 Pervious area fraction = 1.000; Impervious fraction = 0.000 Initial subarea runoff = 1.466 (CFS) Total initial stream area = 0.920 (Ac.) Pervious area fraction = 1.000 End of computations, total study area = 0.92 (Ac.) The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File: UNDEVELOPED6.out
     SUBAREA 6 - UNDEVELOPED CONDITION
     10 YEAR RAIN EVENT
     ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
-----
     Program License Serial Number 6253
     Rational Method Hydrology Program based on
    Riverside County Flood Control & Water Conservation District
    1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
     Process from Point/Station 600.000 to Point/Station
606.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 145.000(Ft.)
    Top (of initial area) elevation = 55.700(Ft.)
     Bottom (of initial area) elevation = 54.900(Ft.)
     Difference in elevation = 0.800(Ft.)
     Slope = 0.00552 \text{ s(percent)} = 0.55
     TC = k(0.530)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 10.977 min.
     Rainfall intensity = 2.503(In/Hr) for a 10.0 year storm
```

UNDEVELOPED (poor cover) subarea Runoff Coefficient = 0.743 Decimal fraction soil group A = 0.000 Decimal fraction soil group B = 0.000 Decimal fraction soil group C = 1.000 Decimal fraction soil group D = 0.000 RI index for soil(AMC 1) = 71.60 Pervious area fraction = 1.000; Impervious fraction = 0.000 Initial subarea runoff = 0.205(CFS) Total initial stream area = 0.110(Ac.) Pervious area fraction = 1.000 End of computations, total study area = 0.11 (Ac.) The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
          Rational Hydrology Study Date: 06/21/16
File:UNDEVELOPED7.out
    _____
     SUBAREA 7 - UNDEVELOPED CONDITION
     10 YEAR RAIN EVENT
     ******* Hydrology Study Control Information *******
      English (in-lb) Units used in input data file
     Program License Serial Number 6253
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
     Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
     Process from Point/Station
                                700.000 to Point/Station
707.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 245.000(Ft.)
     Top (of initial area) elevation = 47.100(Ft.)
     Bottom (of initial area) elevation = 45.900(Ft.)
     Difference in elevation = 1.200(Ft.)
     Slope = 0.00490 \text{ s(percent)} = 0.49
     TC = k(0.530)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 13.866 min.
     Rainfall intensity = 2.181(In/Hr) for a 10.0 year storm
```

UNDEVELOPED (poor cover) subarea Runoff Coefficient = 0.724 Decimal fraction soil group A = 0.000 Decimal fraction soil group B = 0.000 Decimal fraction soil group C = 1.000 Decimal fraction soil group D = 0.000 RI index for soil (AMC 1) = 71.60 Pervious area fraction = 1.000; Impervious fraction = 0.000 Initial subarea runoff = 0.553 (CFS) Total initial stream area = 0.350 (Ac.) Pervious area fraction = 1.000 End of computations, total study area = 0.35 (Ac.) The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File: UNDEVELOPED8.out
    SUBAREA 8 - UNDEVELOPED CONDITION
    10 YEAR RAIN EVENT
    Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
     Program License Serial Number 6253
     _____
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
     Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
                              800.000 to Point/Station
     Process from Point/Station
808.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 240.000(Ft.)
     Top (of initial area) elevation = 46.400(Ft.)
     Bottom (of initial area) elevation = 45.200(Ft.)
     Difference in elevation = 1.200(Ft.)
     Slope = 0.00500 \text{ s(percent)} = 0.50
     TC = k(0.530)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 13.695 min.
     Rainfall intensity = 2.197(In/Hr) for a 10.0 year storm
```

UNDEVELOPED (poor cover) subarea Runoff Coefficient = 0.725Decimal fraction soil group A = 0.000Decimal fraction soil group B = 0.000Decimal fraction soil group C = 1.000Decimal fraction soil group D = 0.000RI index for soil(AMC 1) = 71.60Pervious area fraction = 1.000; Impervious fraction = 0.000Initial subarea runoff = 0.558(CFS)
Total initial stream area = 0.350(Ac.)
Pervious area fraction = 1.000End of computations, total study area = 0.35 (Ac.)
The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
          Rational Hydrology Study Date: 06/21/16
File:UNDEVELOPED9.out
     SUBAREA 9 - UNDEVELOPED CONDITION
     10 YEAR RAIN EVENT
     _____
     ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
____
     Program License Serial Number 6253
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
     Process from Point/Station 900.000 to Point/Station
909.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 255.000(Ft.)
     Top (of initial area) elevation = 48.700(Ft.)
     Bottom (of initial area) elevation = 47.400(Ft.)
     Difference in elevation = 1.300(Ft.)
     Slope = 0.00510 \text{ s(percent)} = 0.51
     TC = k(0.530)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 13.977 min.
     Rainfall intensity = 2.171(In/Hr) for a 10.0 year storm
```

UNDEVELOPED (poor cover) subarea Runoff Coefficient = 0.724 Decimal fraction soil group A = 0.000 Decimal fraction soil group B = 0.000 Decimal fraction soil group C = 1.000 Decimal fraction soil group D = 0.000 RI index for soil(AMC 1) = 71.60 Pervious area fraction = 1.000; Impervious fraction = 0.000 Initial subarea runoff = 1.241(CFS) Total initial stream area = 0.790(Ac.) Pervious area fraction = 1.000 End of computations, total study area = 0.790 (Ac.) The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
          Rational Hydrology Study Date: 06/21/16
File:UNDEVELOPED10.out
    SUBAREA 10 - UNDEVELOPED CONDITION
    10 YEAR RAIN EVENT
     ______
     ******* Hydrology Study Control Information ********
     English (in-lb) Units used in input data file
     Program License Serial Number 6253
    Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
     Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
     Process from Point/Station
                              1000.000 to Point/Station
1010.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 330.000(Ft.)
     Top (of initial area) elevation = 46.200(Ft.)
     Bottom (of initial area) elevation = 44.500(Ft.)
     Difference in elevation = 1.700(Ft.)
     Slope = 0.00515 \text{ s(percent)} = 0.52
     TC = k(0.530)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 15.463 min.
     Rainfall intensity = 2.045(In/Hr) for a 10.0 year storm
```

UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.715
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 71.60
Pervious area fraction = 1.000; Impervious fraction = 0.000
Initial subarea runoff = 1.696(CFS)
Total initial stream area = 1.160(Ac.)
Pervious area fraction = 1.000
End of computations, total study area = 1.16 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 1.000

Area averaged RI index number = 86.0

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
        Rational Hydrology Study Date: 06/21/16
File:UNDEVELOPED11.out
    ______
    SUBAREA 11 - UNDEVELOPED CONDITION
    10 YEAR RAIN EVENT
    _______
     ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
    _____
    Program License Serial Number 6253
    Rational Method Hydrology Program based on
    Riverside County Flood Control & Water Conservation District
    1978 hydrology manual
    Storm event (year) = 10.00 Antecedent Moisture Condition = 1
    2 year, 1 hour precipitation = 0.380(In.)
    100 year, 1 hour precipitation = 1.690(In.)
    Storm event year = 10.0
    Calculated rainfall intensity data:
    1 hour intensity = 0.919(In/Hr)
    Slope of intensity duration curve = 0.5900
    ++++
    Process from Point/Station 1100.000 to Point/Station
1111.000
    **** INITIAL AREA EVALUATION ****
    Initial area flow distance = 435.000(Ft.)
    Top (of initial area) elevation = 39.600(Ft.)
    Bottom (of initial area) elevation = 37.400(Ft.)
    Difference in elevation = .2.200(Ft.)
    Slope = 0.00506 \text{ s(percent)} = 0.51
    TC = k(0.530)*[(length^3)/(elevation change)]^0.2
    Initial area time of concentration = 17.333 min.
    Rainfall intensity = 1.912(In/Hr) for a 10.0 year storm
```

UNDEVELOPED (poor cover) subarea Runoff Coefficient = 0.705Decimal fraction soil group A = 0.000Decimal fraction soil group B = 0.000Decimal fraction soil group C = 1.000Decimal fraction soil group D = 0.000RI index for soil(AMC 1) = 71.60Pervious area fraction = 1.000; Impervious fraction = 0.000Initial subarea runoff = 1.631(CFS)
Total initial stream area = 1.210(Ac.)
Pervious area fraction = 1.000End of computations, total study area = 1.21 (Ac.)
The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File:UNDEVELOPED12.out
    ______
    SUBAREA 12 - UNDEVELOPED CONDITION
    10 YEAR RAIN EVENT
    ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
    Program License Serial Number 6253
    Rational Method Hydrology Program based on
    Riverside County Flood Control & Water Conservation District
    1978 hydrology manual
    Storm event (year) = 10.00 Antecedent Moisture Condition = 1
    2 year, 1 hour precipitation = 0.380(In.)
    100 year, 1 hour precipitation = 1.690(In.)
    Storm event year = 10.0
    Calculated rainfall intensity data:
    1 hour intensity = 0.919(In/Hr)
    Slope of intensity duration curve = 0.5900
    ++++
    Process from Point/Station 1200.000 to Point/Station
1212.000
    **** INITIAL AREA EVALUATION ****
    Initial area flow distance = 270.000(Ft.)
    Top (of initial area) elevation = 45.200(Ft.)
    Bottom (of initial area) elevation = 43.800(Ft.)
    Difference in elevation = 1.400(Ft.)
    Slope = 0.00519 \text{ s(percent)} = 0.52
    TC = k(0.530)*[(length^3)/(elevation change)]^0.2
    Initial area time of concentration = 14.252 min.
    Rainfall intensity = 2.146(In/Hr) for a 10.0 year storm
```

UNDEVELOPED (poor cover) subarea Runoff Coefficient = 0.722 Decimal fraction soil group A = 0.000 Decimal fraction soil group B = 0.000 Decimal fraction soil group C = 1.000 Decimal fraction soil group D = 0.000 RI index for soil (AMC 1) = 71.60 Pervious area fraction = 1.000; Impervious fraction = 0.000 Initial subarea runoff = 0.899 (CFS) Total initial stream area = 0.580 (Ac.) Pervious area fraction = 1.000 End of computations, total study area = 0.58 (Ac.) The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File:UNDEVELOPED13.out
    SUBAREA 13 - UNDEVELOPED CONDITION
    10 YEAR RAIN EVENT
     ______
     ******* Hydrology Study Control Information ********
     English (in-lb) Units used in input data file
     Program License Serial Number 6253
       ______
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
     Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
     Process from Point/Station
                              1300.000 to Point/Station
1313.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 290.000(Ft.)
     Top (of initial area) elevation = 43.900(Ft.)
     Bottom (of initial area) elevation = 42.400(Ft.)
     Difference in elevation = 1.500(Ft.)
     Slope = 0.00517 \text{ s(percent)} = 0.52
     TC = k(0.530)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 14.672 min.
     Rainfall intensity = 2.109(In/Hr) for a 10.0 year storm
```

UNDEVELOPED (poor cover) subarea Runoff Coefficient = 0.720Decimal fraction soil group A = 0.000Decimal fraction soil group B = 0.000Decimal fraction soil group C = 1.000Decimal fraction soil group D = 0.000RI index for soil(AMC 1) = 71.60Pervious area fraction = 1.000; Impervious fraction = 0.000Initial subarea runoff = 0.865(CFS)
Total initial stream area = 0.570(Ac.)
Pervious area fraction = 1.000End of computations, total study area = 0.57 (Ac.)
The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File:DEVELOPED1.out
    _____
    SUBAREA 1 - DEVELOPED CONDITION
    10 YEAR RAIN EVENT
     ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
     Program License Serial Number 6253
     ______
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
     Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     Process from Point/Station
                              100.000 to Point/Station
101.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 410.000(Ft.)
     Top (of initial area) elevation = 51.400(Ft.)
     Bottom (of initial area) elevation = 49.300(Ft.)
     Difference in elevation = 2.100(Ft.)
     Slope = 0.00512 \text{ s(percent)} = 0.51
     TC = k(0.300)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 9.558 min.
     Rainfall intensity = 2.716(In/Hr) for a 10.0 year storm
```

COMMERCIAL subarea type Runoff Coefficient = 0.870Decimal fraction soil group A = 0.000Decimal fraction soil group B = 0.000Decimal fraction soil group C = 1.000Decimal fraction soil group D = 0.000RI index for soil(AMC 1) = 49.80Pervious area fraction = 0.100; Impervious fraction = 0.900Initial subarea runoff = 0.851(CFS)
Total initial stream area = 0.360(Ac.)
Pervious area fraction = 0.100End of computations, total study area = 0.360 (Ac.)
The following figures may be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100

Area averaged RI index number = 69.0

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
          Rational Hydrology Study Date: 06/21/16
File: DEVELOPED2.out
    _______
    SUBAREA 2 - DEVELOPED CONDITION
    10 YEAR RAIN EVENT
     ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
     Program License Serial Number 6253
     _______
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
     Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
     Process from Point/Station
                              200.000 to Point/Station
202.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 275.000(Ft.)
     Top (of initial area) elevation = 51.400(Ft.)
     Bottom (of initial area) elevation = 50.000(Ft.)
     Difference in elevation = 1.400(Ft.)
     Slope = 0.00509 \text{ s(percent)} = 0.51
     TC = k(0.300)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 8.156 min.
     Rainfall intensity = 2.983(In/Hr) for a 10.0 year storm
```

COMMERCIAL subarea type Runoff Coefficient = 0.872 Decimal fraction soil group A = 0.000 Decimal fraction soil group B = 0.000 Decimal fraction soil group C = 1.000 Decimal fraction soil group D = 0.000 RI index for soil (AMC 1) = 49.80 Pervious area fraction = 0.100; Impervious fraction = 0.900 Initial subarea runoff = 2.029 (CFS) Total initial stream area = 0.780 (Ac.) Pervious area fraction = 0.100 End of computations, total study area = 0.78 (Ac.) The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File:DEVELOPED3.out
    SUBAREA 3 - DEVELOPED CONDITION
    10 YEAR RAIN EVENT
     _____
     ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
     Program License Serial Number 6253
     _____
     Rational Method Hydrology Program based on
    Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
     Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
     Process from Point/Station
                              300.000 to Point/Station
303.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 335.000(Ft.)
     Top (of initial area) elevation = 49.600(Ft.)
     Bottom (of initial area) elevation = 47.900(Ft.)
     Difference in elevation = 1.700(Ft.)
     Slope = 0.00507 \text{ s(percent)} = 0.51
     TC = k(0.300)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 8.832 min.
     Rainfall intensity = 2.846(In/Hr) for a 10.0 year storm
```

```
COMMERCIAL subarea type
Runoff Coefficient = 0.871
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 49.80
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 1.611(CFS)
Total initial stream area =
                                 0.650(Ac.)
Pervious area fraction = 0.100
End of computations, total study area =
                                                    0.65 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Area averaged pervious area fraction(Ap) = 0.100
Area averaged RI index number = 69.0
```

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study
                                   Date: 06/21/16
File:DEVELOPED4.out
    SUBAREA 4 - DEVELOPED CONDITION
    10 YEAR RAIN EVENT
    _______
     ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
     Program License Serial Number 6253
     ______
    Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
     Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
     Process from Point/Station
                              400.000 to Point/Station
404.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 450.000(Ft.)
     Top (of initial area) elevation = 55.400(Ft.)
     Bottom (of initial area) elevation = 53.100(Ft.)
     Difference in elevation = 2.300(Ft.)
     Slope = 0.00511 \text{ s(percent)} = 0.51
     TC = k(0.300)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 9.924 min.
     Rainfall intensity = 2.657(In/Hr) for a 10.0 year storm
```

COMMERCIAL subarea type Runoff Coefficient = 0.870Decimal fraction soil group A = 0.000Decimal fraction soil group B = 0.000Decimal fraction soil group C = 1.000Decimal fraction soil group D = 0.000RI index for soil (AMC 1) = 49.80Pervious area fraction = 0.100; Impervious fraction = 0.900Initial subarea runoff = 3.998 (CFS)
Total initial stream area = 1.730 (Ac.)
Pervious area fraction = 0.100End of computations, total study area = 1.730 (Ac.)
The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File:DEVELOPED5.out
    ______
    SUBAREA 5 - DEVELOPED CONDITION
    10 YEAR RAIN EVENT
    Hydrology Study Control Information ********
     English (in-lb) Units used in input data file
    Program License Serial Number 6253
     ______
    Rational Method Hydrology Program based on
    Riverside County Flood Control & Water Conservation District
    1978 hydrology manual
    Storm event (year) = 10.00 Antecedent Moisture Condition = 1
    2 year, 1 hour precipitation = 0.380(In.)
    100 year, 1 hour precipitation = 1.690(In.)
    Storm event year = 10.0
    Calculated rainfall intensity data:
    1 hour intensity = 0.919(In/Hr)
    Slope of intensity duration curve = 0.5900
    ++++
    Process from Point/Station
                             500.000 to Point/Station
505.000
    **** INITIAL AREA EVALUATION ****
    Initial area flow distance = 240.000(Ft.)
    Top (of initial area) elevation = 51.500(Ft.)
    Bottom (of initial area) elevation = 50.300(Ft.)
    Difference in elevation = 1.200(Ft.)
    Slope = 0.00500 \text{ s(percent)} = 0.50
    TC = k(0.300)*[(length^3)/(elevation change)]^0.2
    Initial area time of concentration = 7.752 min.
    Rainfall intensity = 3.074(In/Hr) for a 10.0 year storm
```

COMMERCIAL subarea type Runoff Coefficient = 0.873 Decimal fraction soil group A = 0.000 Decimal fraction soil group B = 0.000 Decimal fraction soil group C = 1.000 Decimal fraction soil group D = 0.000 RI index for soil(AMC 1) = 49.80 Pervious area fraction = 0.100; Impervious fraction = 0.900 Initial subarea runoff = 2.468 (CFS) Total initial stream area = 0.920 (Ac.) Pervious area fraction = 0.100 End of computations, total study area = 0.92 (Ac.) The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
          Rational Hydrology Study Date: 06/21/16
File: DEVELOPED6.out
    ______
    SUBAREA 6 - DEVELOPED CONDITION
     10 YEAR EVENT
     ******* Hydrology Study Control Information *******
      English (in-lb) Units used in input data file
     Program License Serial Number 6253
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
     Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
     Process from Point/Station
                                600.000 to Point/Station
606.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 145.000(Ft.)
     Top (of initial area) elevation = 55.700(Ft.)
     Bottom (of initial area) elevation = 54.900(Ft.)
     Difference in elevation = 0.800(Ft.)
     Slope = 0.00552 \text{ s(percent)} = 0.55
     TC = k(0.300)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 6.213 min.
     Rainfall intensity = 3.502(In/Hr) for a 10.0 year storm
```

COMMERCIAL subarea type Runoff Coefficient = 0.875Decimal fraction soil group A = 0.000Decimal fraction soil group B = 0.000Decimal fraction soil group C = 1.000Decimal fraction soil group D = 0.000RI index for soil(AMC 1) = 49.80Pervious area fraction = 0.100; Impervious fraction = 0.900Initial subarea runoff = 0.337(CFS)
Total initial stream area = 0.110(Ac.)
Pervious area fraction = 0.100End of computations, total study area = 0.11 (Ac.)
The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File:7DEVELOPED7.out
       ______
    SUBAREA 7 - DEVELOPED CONDITION
    10 YEAR RAIN EVENT
    ______
     ******* Hydrology Study Control Information ********
     English (in-lb) Units used in input data file
    Program License Serial Number 6253
     _____
    Rational Method Hydrology Program based on
    Riverside County Flood Control & Water Conservation District
    1978 hydrology manual
    Storm event (year) = 10.00 Antecedent Moisture Condition = 1
    2 year, 1 hour precipitation = 0.380(In.)
    100 year, 1 hour precipitation = 1.690(In.)
    Storm event year = 10.0
    Calculated rainfall intensity data:
    1 hour intensity = 0.919(In/Hr)
    Slope of intensity duration curve = 0.5900
    ++++
    Process from Point/Station
                             700.000 to Point/Station
707.000
    **** INITIAL AREA EVALUATION ****
    Initial area flow distance = 245.000(Ft.)
    Top (of initial area) elevation = 47.100(Ft.)
    Bottom (of initial area) elevation = 45.900(Ft.)
    Difference in elevation = 1.200(Ft.)
    Slope = 0.00490 \text{ s(percent)} = 0.49
    TC = k(0.300)*[(length^3)/(elevation change)]^0.2
    Initial area time of concentration = 7.848 min.
    Rainfall intensity = 3.051(In/Hr) for a 10.0 year storm
```

COMMERCIAL subarea type
Runoff Coefficient = 0.872
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 49.80
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.932(CFS)
Total initial stream area = 0.350(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.35 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File: DEVELOPED8.out
    ______
    SUBAREA 8 - DEVELOPED CONDITION
    10 YEAR RAIN EVENT
     ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
    Program License Serial Number 6253
     ______
    Rational Method Hydrology Program based on
    Riverside County Flood Control & Water Conservation District
    1978 hydrology manual
    Storm event (year) = 10.00 Antecedent Moisture Condition = 1
    2 year, 1 hour precipitation = 0.380(In.)
    100 year, 1 hour precipitation = 1.690(In.)
    Storm event year = 10.0
    Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
    ++++
     Process from Point/Station
                              800.000 to Point/Station
808.000
     **** INITIAL AREA EVALUATION ****
    Initial area flow distance = 240.000(Ft.)
    Top (of initial area) elevation = 46.400(Ft.)
    Bottom (of initial area) elevation = 45.200(Ft.)
    Difference in elevation = 1.200(Ft.)
     Slope = 0.00500 \text{ s(percent)} = 0.50
    TC = k(0.300)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 7.752 min.
    Rainfall intensity = 3.074(In/Hr) for a 10.0 year storm
```

COMMERCIAL subarea type
Runoff Coefficient = 0.873
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
RI index for soil(AMC 1) = 49.80
Pervious area fraction = 0.100; Impervious fraction = 0.900
Initial subarea runoff = 0.939(CFS)
Total initial stream area = 0.350(Ac.)
Pervious area fraction = 0.100
End of computations, total study area = 0.35 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
        Rational Hydrology Study Date: 06/21/16
File:DEVELOPED9.out
    ______
    SUBAREA 9 - DEVELOPED CONDITION
    10 YEAR RAIN EVENT
    ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
    ______
    Program License Serial Number 6253
    Rational Method Hydrology Program based on
    Riverside County Flood Control & Water Conservation District
    1978 hydrology manual
    Storm event (year) = 10.00 Antecedent Moisture Condition = 1
    2 year, 1 hour precipitation = 0.380(In.)
    100 year, 1 hour precipitation = 1.690(In.)
    Storm event year = 10.0
    Calculated rainfall intensity data:
    1 hour intensity = 0.919(In/Hr)
    Slope of intensity duration curve = 0.5900
    Process from Point/Station 900.000 to Point/Station
909.000
    **** INITIAL AREA EVALUATION ****
    Initial area flow distance = 255.000(Ft.)
    Top (of initial area) elevation = 48.700(Ft.)
    Bottom (of initial area) elevation = 47.400(Ft.)
    Difference in elevation = 1.300(Ft.)
    Slope = 0.00510 \text{ s(percent)} = 0.51
    TC = k(0.300)*[(length^3)/(elevation change)]^0.2
    Initial area time of concentration = 7.911 min.
    Rainfall intensity = 3.037(In/Hr) for a 10.0 year storm
```

COMMERCIAL subarea type Runoff Coefficient = 0.872Decimal fraction soil group A = 0.000Decimal fraction soil group B = 0.000Decimal fraction soil group C = 1.000Decimal fraction soil group D = 0.000RI index for soil(AMC 1) = 49.80Pervious area fraction = 0.100; Impervious fraction = 0.900Initial subarea runoff = 0.903 (CFS)
Total initial stream area = 0.790 (Ac.)
Pervious area fraction = 0.100End of computations, total study area = 0.790 (Ac.)
The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File: DEVELOPED10.out
    ,_____
    SUBAREA 10 - DEVELOPED CONDITION
    10 YEWAR RAIN EVENT
     ******* Hydrology Study Control Information ********
     English (in-lb) Units used in input data file
     Program License Serial Number 6253
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
     Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     ++++
     Process from Point/Station
                              1000.000 to Point/Station
1010.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 330.000(Ft.)
    Top (of initial area) elevation = 46.200(Ft.)
     Bottom (of initial area) elevation = 44.500(Ft.)
     Difference in elevation = 1.700(Ft.)
     Slope = 0.00515 \text{ s(percent)} = 0.52
     TC = k(0.300)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 8.753 min.
     Rainfall intensity = 2.861(In/Hr) for a 10.0 year storm
```

COMMERCIAL subarea type Runoff Coefficient = 0.871Decimal fraction soil group A = 0.000Decimal fraction soil group B = 0.000Decimal fraction soil group C = 1.000Decimal fraction soil group D = 0.000RI index for soil(AMC 1) = 49.80Pervious area fraction = 0.100; Impervious fraction = 0.900Initial subarea runoff = 2.892(CFS)Total initial stream area = 1.160(Ac.)Pervious area fraction = 0.100End of computations, total study area = 1.16(Ac.)The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File:DEVELOPED11.out
    _____
    SUBAREA 11 - DEVELOPED CONDITION
    _____
     ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
    ______
    Program License Serial Number 6253
    Rational Method Hydrology Program based on
    Riverside County Flood Control & Water Conservation District
    1978 hydrology manual
    Storm event (year) = 10.00 Antecedent Moisture Condition = 1
    2 year, 1 hour precipitation = 0.380(In.)
    100 year, 1 hour precipitation = 1.690(In.)
    Storm event year = 10.0
    Calculated rainfall intensity data:
    1 hour intensity = 0.919(In/Hr)
    Slope of intensity duration curve = 0.5900
    ++++
    Process from Point/Station 1100.000 to Point/Station
1111.000
    **** INITIAL AREA EVALUATION ****
    Initial area flow distance = 434.000(Ft.)
    Top (of initial area) elevation = 39.600(Ft.)
    Bottom (of initial area) elevation = 37.400(Ft.)
    Difference in elevation = 2.200(Ft.)
    Slope = 0.00507 \text{ s(percent)} = 0.51
    TC = k(0.300)*[(length^3)/(elevation change)]^0.2
    Initial area time of concentration = 9.798 min.
    Rainfall intensity = 2.677(In/Hr) for a 10.0 year storm
```

COMMERCIAL subarea type Runoff Coefficient = 0.870Decimal fraction soil group A = 0.000Decimal fraction soil group B = 0.000Decimal fraction soil group C = 1.000Decimal fraction soil group D = 0.000RI index for soil(AMC 1) = 49.80Pervious area fraction = 0.100; Impervious fraction = 0.900Initial subarea runoff = 2.818(CFS)
Total initial stream area = 1.210(Ac.)
Pervious area fraction = 0.100End of computations, total study area = 1.21 (Ac.)
The following figures may be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.100

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
          Rational Hydrology Study Date: 06/21/16
File:DEVELOPED12.out
     SUBAREA 12
     DEVELOPED CONDITION
     10 YEAR RAIN EVENT
               Hydrology Study Control Information ********
      English (in-lb) Units used in input data file
     Program License Serial Number 6253
           _____
     Rational Method Hydrology Program based on
     Riverside County Flood Control & Water Conservation District
     1978 hydrology manual
     Storm event (year) = 10.00 Antecedent Moisture Condition = 1
     2 year, 1 hour precipitation = 0.380(In.)
     100 year, 1 hour precipitation = 1.690(In.)
     Storm event year = 10.0
     Calculated rainfall intensity data:
     1 hour intensity = 0.919(In/Hr)
     Slope of intensity duration curve = 0.5900
     + + + +
                               1200.000 to Point/Station
     Process from Point/Station
1212.000
     **** INITIAL AREA EVALUATION ****
     Initial area flow distance = 270.000(Ft.)
     Top (of initial area) elevation = 45.200(Ft.)
     Bottom (of initial area) elevation = 43.800(Ft.)
     Difference in elevation = 1.400(Ft.)
     Slope = 0.00519 \text{ s(percent)} = 0.52
     TC = k(0.300)*[(length^3)/(elevation change)]^0.2
     Initial area time of concentration = 8.067 min.
     Rainfall intensity = 3.002(In/Hr) for a 10.0 year storm
```

COMMERCIAL subarea type Runoff Coefficient = 0.872 Decimal fraction soil group A = 0.000 Decimal fraction soil group B = 0.000 Decimal fraction soil group C = 1.000 Decimal fraction soil group D = 0.000 RI index for soil(AMC 1) = 49.80 Pervious area fraction = 0.100; Impervious fraction = 0.900 Initial subarea runoff = 1.519(CFS) Total initial stream area = 0.580(Ac.) Pervious area fraction = 0.100 End of computations, total study area = 0.58 (Ac.) The following figures may be used for a unit hydrograph study of the same area.

```
CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989 - 2005 Version
7.1
         Rational Hydrology Study Date: 06/21/16
File: DEVELOPED13.out
    SUBAREA 13 - DEVELOPED CONDITION
    10 YEAR RAIN EVENT
    ******* Hydrology Study Control Information *******
     English (in-lb) Units used in input data file
    Program License Serial Number 6253
    Rational Method Hydrology Program based on
    Riverside County Flood Control & Water Conservation District
    1978 hydrology manual
    Storm event (year) = 10.00 Antecedent Moisture Condition = 1
    2 year, 1 hour precipitation = 0.380(In.)
    100 year, 1 hour precipitation = 1.690(In.)
    Storm event year = 10.0
    Calculated rainfall intensity data:
    1 hour intensity = 0.919(In/Hr)
    Slope of intensity duration curve = 0.5900
    ++++
    Process from Point/Station
                            1300.000 to Point/Station
1313.000
    **** INITIAL AREA EVALUATION ****
    Initial area flow distance = 290.000(Ft.)
    Top (of initial area) elevation = 43.900(Ft.)
    Bottom (of initial area) elevation = 42.400(Ft.)
    Difference in elevation = 1.500(Ft.)
    Slope = 0.00517 \text{ s(percent)} = 0.52
    TC = k(0.300)*[(length^3)/(elevation change)]^0.2
    Initial area time of concentration = 8.305 min.
    Rainfall intensity = 2.951(In/Hr) for a 10.0 year storm
```

COMMERCIAL subarea type Runoff Coefficient = 0.872 Decimal fraction soil group A = 0.000Decimal fraction soil group B = 0.000Decimal fraction soil group C = 1.000Decimal fraction soil group D = 0.000RI index for soil(AMC $\overline{1}$) = 49.80 Pervious area fraction = 0.100; Impervious fraction = 0.900 Initial subarea runoff = 1.467 (CFS) Total initial stream area = 0.570(Ac.) Pervious area fraction = 0.100 0.57 (Ac.) End of computations, total study area = The following figures may be used for a unit hydrograph study of the same area. Area averaged pervious area fraction(Ap) = 0.100

Area averaged RI index number = 69.0

